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Next Year's Convention

IN the autumn of last year we urged that a National Canvass of the public should be made with the object of securing additional consumers everywhere. Great interest was taken in the proposal, and domestic electrical business is advancing. Some undertakings are more alert than they were, but the position is still far from what it should be. There is much business to be got and we ought to get it soon.

The urgency of matters was further stressed a few months ago in an article on "The Electrical Future of Britain," which indicated lines along which we might operate in order to accelerate the loading up of the grid. Many minds were set working anew. The time is now ripe for making further propositions, which we commend to the careful attention of everybody who can pull any weight.

Three weeks ago we briefly mentioned two things often hinted at here. First, the desirability of holding a large electrical show in London to draw the general public. Secondly, the need for a big National Electrical Convention. Leaving the first of these suggestions for the moment, let us concentrate upon the second.

The proposal for a big Convention next year is now before the Electrical Development Association—quite the right place for its introduction. It will come under consideration at the next meeting of the General Purposes Committee. We suggest that the Convention take place in the early summer, instead of the usual sectional conventions, and that it shall include *all* electricity supply interests.

The Electrical Development Association, as the mother of all, should be the organising body. Sir Andrew Duncan, because of his unique position as head of the Central Electricity Board, should be president of the Convention; his keen interest in securing the success of electricity supply is a sure sign of his willingness to give valued co-operation in such a capacity. The support of the Board and of the Commission is a foregone conclusion.

The purpose of the Convention should be to bring together as never before—with one common aim and harmoniously—many thousands of electrical men representing all the interests directly concerned in promoting rapid and sure development of electricity among all the people of the land. This means, among other things, that directors of all electricity supply and power companies, and laymen on municipal committees, should be induced to attend.

Let it be a campaign lasting for one week, and run on high-tension lines—a strong movement boosting electricity through one central gathering and organisation with a presidential address delivered from the strongest platform of electrical men that can be brought together. Simultaneously let us have local electrical efforts with popular shows and demonstrations from end to end of the country, and broadcast speeches by Sir Andrew Duncan and/or Mr. Pybus—what a paucity of electrical matter comes over the ether at present!

Centrally there could be sectional non-technical meetings where matters could be of a popular character appealing to the Press, and where electrical men could talk over their common interests. There could be popular demonstrations, travelling and stationary, sparkflying and illuminated gala nights, E.D.A. aeroplane flights, and all sorts of other attractive and unconventional things which may emerge from flights of the imagination.

We hope that when the Committee meets it will be able to feel that everybody whose influence counts is behind it. Let all old differences and petty sectional jealousies be dissolved, so that with a strong, unanimous determination the whole industry can launch the project sure of an overwhelming success.

Make the Connection

WE have noticed an increasing tendency by supply undertakings to adopt the definite policy of obtaining as many consumers as possible, however small their initial requirements may be or whatever the purpose for which the current is required. In our issue of June 10th we referred to the satisfactory results that followed Mr. Morley New's extension of this principle to stand-by and "convenience" sup-

plies at Cardiff. When we visited Wolverhampton rural area a few days ago we found ample evidence of the soundness of the view that other uses speedily follow lighting. We like Mr. Margary's system of running three-phase four-wire 0.0225 sq. in. services into all but the smallest dwellings. The additional copper costs little, far less than relaying the service later, which will otherwise be necessary in many cases under progressive management. The use of three-phase services also enables the load on the distributors to be balanced very closely, and as voltage drop is more important than current-carrying capacity, it may postpone expenditure on laying further high-voltage feeders as the undertaking expands.

The Man Behind

THE claims made by Mr. Taylor at the E.P.E.A. dinner concerning the achievements of the Association were high claims, but we believe them to be justified. Distinguished guests made it clear in their speeches that the Association is respected in all circles, and the successful working of the National Joint Board is envied in many other industries. The N.J.B. carries weight because the Association represents what Mr. R. S. Hudson, M.P., called "the cream of the technical officers." It will continue to do so if the younger men are ready to give it their active support. The status (including the economic status) of supply engineers—and by "induction" of all electrical engineers—has improved enormously since the formation of the Association, and the impetus it has given to technical improvement in personnel is quite apparent. We have an unequalled national machine for electrical production, as Sir John Brooke stated, but it is to the man behind the machine that we must look for efficient operation. In this, the organised electrical power engineers must play a dominant part, whether in generation or in distribution.

By Any Other Name

A NOTABLE change took place at the end of last week in the electricity supply world. What has been for very many years known as the Newcastle-upon-Tyne Electric Supply Co., Ltd., has now become the North-Eastern Electric Supply Co., Ltd. The alteration is, of course, more appropriate to the increased area in which the company will operate directly consequent upon the absorption of a number of other companies with which it has long been associated. All existing agreements and obligations as affecting contractors and consumers will be continued as is announced in our Business Notes to-day.

Consumers and Fuses

A CORRESPONDENT in this issue utters a warning against consumers being allowed to renew fuses, and sends us a cutting reporting a death from this cause. The report of the subsequent inquest, however, cancels this out, for it was disclosed that the man had attempted to attach a piece of flex to a kitchen pendant without first switching off. While we agree that care must be exercised in the replacement of fuses, we cannot support the idea that a contractor or supply man should be sent for every time a fuse blows, though, of course, it is recognised that there are many households where there is nobody competent to do such a thing, and we have no right to expect them to do it if they do not so desire. This is one of the matters in which many consumers can be educated; but there are other considerations. For instance, fuseboards should not be put in damp or totally inaccessible places, as they often are, and the fuse bridges should be of a type which facilitates rewiring. Another possible development, of course, is the abolition of fuses in favour of the small circuit breakers which have been described in our columns.

The Fire at Brussels

THE fire at the principal generating station in Brussels, which caused extensive damage to the plant and seriously dislocated the electricity supply services, brings home to each of us how much more we are dependent on electricity than we were even a few years ago. The worst effects were mitigated by arrangements with other supply systems to provide a certain amount of lighting without undue delay, but it is evident that had suitable provision been in existence for interconnection with other undertakings the conditions would have been very much better. Interconnection provides the best form of standby, and is called for by the modern need for continuity of supply. We had our own experience of this when early this year (as reported in our issue of January 15th) Dalmarnock and Kilmarnock power stations were put out of commission by floods. In this case supplies were maintained by the grid.

Electricity in the Home

Next week's ELECTRICAL REVIEW will be a special

Domestic Number

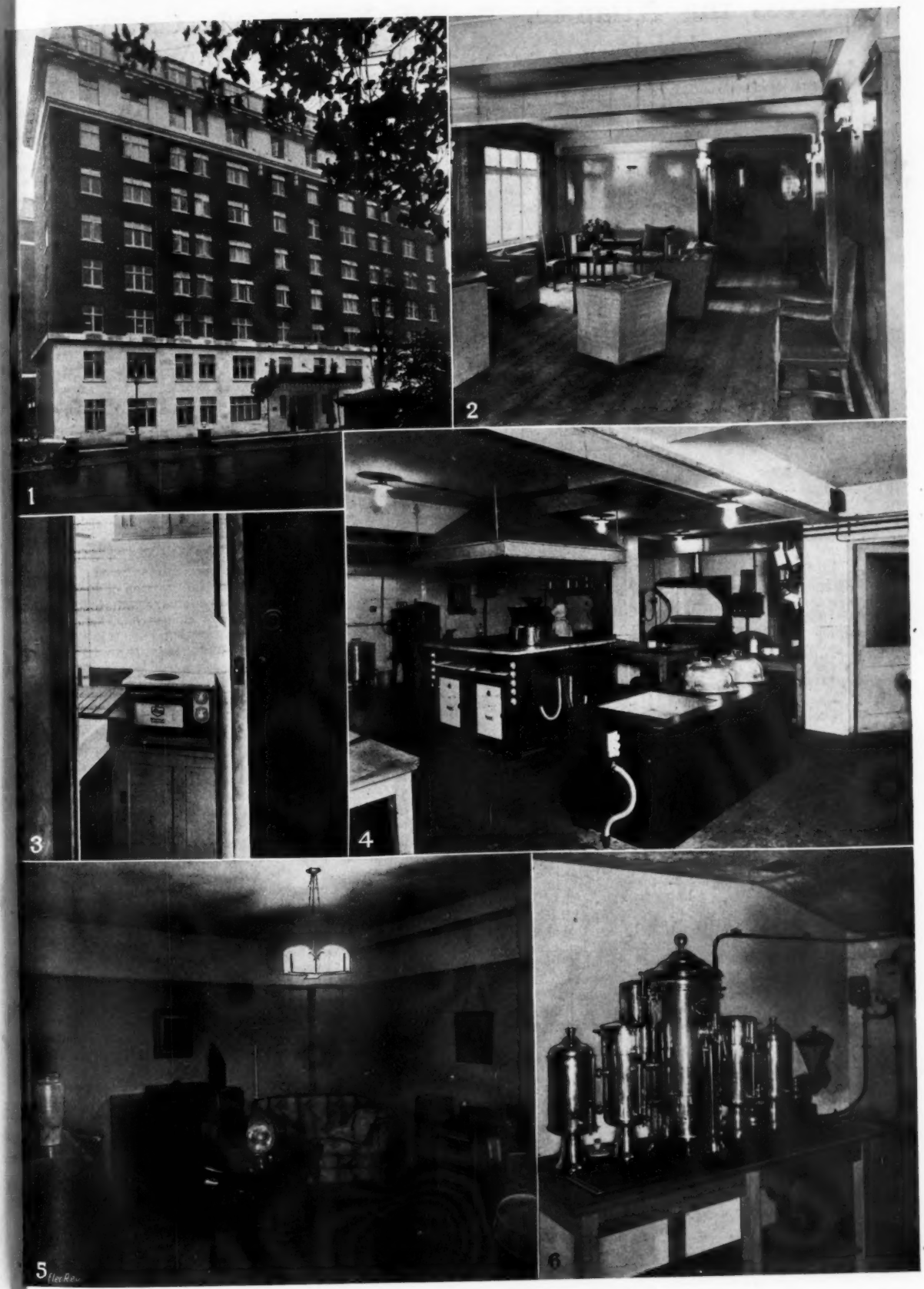
An outstanding feature will be as complete a review as possible of all the appliances and devices now available for employing electricity in the house. It will be classified and fully illustrated, and should prove a valuable work of reference throughout the whole season.

Hotel Lighting

READERS in the London area should take note that the first of the E.D.A. Salesmanship Conferences will be held on Friday next at the Caxton Hall. Hotel lighting and the campaign for improving it will be the subject before the meeting, and Messrs. W. J. Jones and V. W. Dale will be the chief speakers. While some hotels are noted for the excellence of their electrical appointments, there are thousands of bad ones, notoriously those at seaside resorts. The small family hotel and the boarding-house are frequently right behind the times. It is hoped that there will be a full gathering to start the session.

A Two-part Gas Tariff

THE Taunton Gas Co. proposes to introduce a two-part tariff. The fixed charge is to be 9 per cent. of the gross rateable value, payable quarterly, and including meter rent, and the running charge 3s. 2½d. per 1,000 cu. ft. For prepayment-meter consumers the fixed charge will be 15s. per quarter, including cooker rental, or 11s. excluding cooker rental. In the announcement the company points out that the running charge gives 13,650 B.th.u. for one penny. But it goes on to say that this is equivalent to four electrical units, since there are 3,412 B.th.u. in one kWh. A simple matter of arithmetic, surely! It has one defect: the consumer is not interested in any way in the number of heat units supplied to him. His concern is with the heat units which he can effectively use for cooking or warming his rooms, and it is in its very much greater efficiency of utilisation that electricity scores every time. Statements like that of the Gas Company do not make good propaganda, either for the time being, as the consumer will not bother himself with theoretical British thermal units, or ultimately, as he finds out, sooner or later, that there is a "nigger" in it somewhere.



The Abercorn All-electric Flats (*see page* 495)

Something new in the way of residential flats has recently been opened at 29, Abercorn Place, St. John's Wood, N.W.8. For a moderate rental an entirely self-contained 1-, 2- or 3-roomed flat with entrance hall, kitchenette and bathroom is obtainable, in which all the most up-to-date electrical facilities are provided. The exterior of the building (1) presents a very imposing appearance, and some idea of the attractive design of the entrance lounge is to be gained from (2). A small-sized "Revo" or "Magnet" cooker is installed in each of the kitchenettes (3), but meals are also served in the restaurant on the premises and in a small room leading from it is a battery of thermostatically controlled electric water and milk boilers (6) for making tea, coffee, &c. A typical apartment is shown in (5).

D

Across the Atlantic. By H. E. Yerbury, M.Inst.C.E., M.I.E.E.

Impressions of a visit to Canada and the U.S.A.

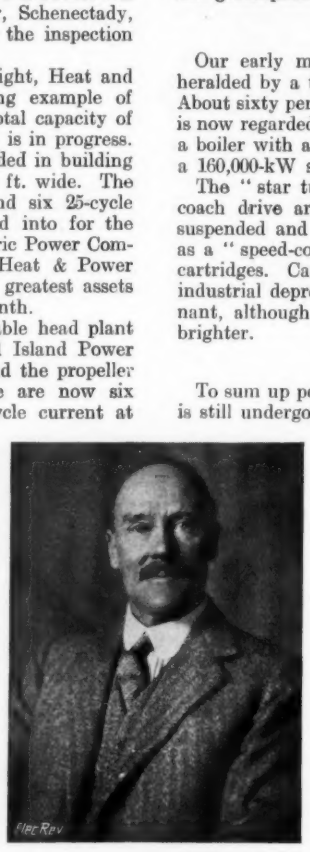
DURING the Canadian meeting arranged by the Institution of Mechanical Engineers visits were made to various works and sightseeing tours were conducted in Quebec, Montreal, Ottawa, Toronto, Rochester, Schenectady, and New York. Every facility was given for the inspection of the principal industries of these cities.

The huge undertaking of the Beauharnois Light, Heat and Power Co. in Montreal proved an outstanding example of vision and enterprise as the installation of a total capacity of hydro-electric plant amounting to 2,000,000 h.p. is in progress. Fifteen million pounds has already been expended in building the canal which is fifteen miles long and 3,300 ft. wide. The initial installation consists of four 60-cycle and six 25-cycle 50,000-h.p. units. Contracts have been entered into for the supply of about 500,000 h.p. to the Hydro-Electric Power Commission of Ontario and the Montreal Light, Heat & Power Consolidated. This scheme is one of Canada's greatest assets and supply is expected to be available this month.

An example of the utilisation of a low variable head plant was inspected at the station of the Montreal Island Power Co. The head varies between 18 and 26 ft. and the propeller type turbines have adjustable blades. There are now six 10,000-kVA generators supplying 3-phase 60-cycle current at 12 kV. These generators are of the fabricated steel construction which is replacing cast-steel or iron construction in Canada and the United States for every class of work. All manufacturing works have large welding plants, and foundry work appears to be a declining industry.

The Gatineau Undertaking

The Gatineau Power Co. of Ottawa is amongst the largest producers on the continent; it has eighteen hydro-electric plants in operation with a total capacity of over 679,000 h.p. This is distributed at 220-kV by lines 230 miles long and the plants at the Gatineau River supply the Hydro-Electric Power Commission of Ontario. This Commission is concerned with bulk transmission over 5,000 miles of line, with about 600 miles operating at from 220 to 224 kV, to various distributing municipalities, the supply being given at as near cost price as possible.



[*Elliott and Fry.*

Mr. H. E. Yerbury

The discussion of a paper read by Dr. F. A. Gaby at the University of Toronto on "The Generation and Distribution of Power Under the Administration of the Hydro-Electric Power Commission of Ontario" largely turned on a comparison of tariffs with those of British undertakings whose low total charges per kWh in some cases appeared to surprise the author. A typical recent quotation given me by a brother consultant shows that the prices of the Montreal Light, Heat, and Power Consolidated are nothing to boast about in comparison with British tariffs. The rate for 500 h.p. of m.d. supplied at 2,300 V (or higher) is a fixed charge of $12 per annum per h.p. of established m.d. plus 1.5 cents per kWh for the first 50 kWh per month per h.p., 0.75 cents per kWh for the second 50 kWh, and 0.5 cents for all usage in excess of 100 kWh per month of established m.d., less 5 per cent. within ten days.

Some Works Visits

The central heating plant at Toronto of over 5,000 h.p. by steam at 180 lb. per sq. in. and an average superheat of 120 deg. F. has an average loss of 6 deg. F. per 100 ft. of pipe line. The absence of domestic chimneys and the clarity of the atmosphere were particularly noticeable in Canada and the United States.

During a visit to the General Electric Co.'s works in Schenectady some beautiful experiments were witnessed in the research laboratory showing the effect of applying 350 kV to a cathode tube. The effects of X-rays on the colour and growth of flowers were exhibited, *e.g.*, a grape fruit flowered in six weeks instead of the normal six months. The effect of radio waves of six to thirty metres on inducing currents in the blood stream of human beings—presumably to their advantage—was demonstrated. Liquid air producing "frozen light," neon lamps and photo-electric tubes, &c., and their many applications such as a.c. blinkers for lamps with no metallic contacts were included.

Arriving at New York by steamboat down the Hudson River at about 9 p.m., we were almost blinded by the thousands of electric lamps—principally advertisements—which met our gaze.

On the following day a visit was made to the Bell Telephone Laboratories, where normally the personnel numbers about 5,000. Demonstrations were given of many appliances, including sound-picture apparatus with the latest form of radio and gramophone records of great clarity and sweetness of tone.

Hell Gate Station

Our early morning visit to Hell Gate power station was heralded by a terrific boiler explosion on a nearby river boat. About sixty perished and the boat was sunk. Hell Gate station is now regarded as somewhat out of date, although it possesses a boiler with a maximum rating of 1,000,000 lb. per hour and a 160,000-kW set which was being partially rebladed.

The "star turn" was undoubtedly the 105 miles non-stop coach drive around New York. All traffic regulations were suspended and our escort was a police motor cyclist (known as a "speed-cop") with a fully loaded revolver and a belt of cartridges. Canada and New York are under a great cloud of industrial depression, and work generally appeared to be stagnant, although the outlook was thought to be somewhat brighter.

Boiler Practice

To sum up power-station impressions, it is obvious that plant is still undergoing gradual development to increase simplicity, reliability, and efficiency. Higher operating pressures and temperatures have proved to be justified. When fuel costs are high or where a plant can be loaded throughout the year, mercury-vapour plant is being adopted. The Hartford Electric Supply Co.'s mercury boiler and turbine have operated in series with a steam turbine successfully for one year with an average fuel consumption of 10,250 B.th.u. per kWh. Two mercury units of 20,000-kW capacity are now under construction.

Power-house structures are being eliminated in order to lower costs. The unit system of pulverised coal firing is gaining favour, and unit mills with capacities of up to fifty tons per hour are in operation.

Steam temperatures vary from 700 to about 850 deg. F. as a maximum, and turbines are bled at one to five points for regenerative feed heating. The highest boiler plant efficiency is claimed to be 88.3 per cent. with powdered fuel. The trend is toward boiler units of great capacity both in area of heating surface and steam output. One boiler in service has a maximum rating of 1,250,000 lb. per hour. The lowest annual load factor for steam stations is 34 per cent.; others rise to a maximum of 87 per cent.

The problems experienced appear to be on a par with those in the old country. Serious trouble is caused by erosion and corrosion of both water and steam turbine blades; alloy steels are superseding ordinary steel for blades and many impellers are being repaired by spot welding over large areas with chromium steel. Make-up water for high pressure boilers is generally distilled, and troubles have been reduced by deaerating all feed water. Dry steam drums are coming into use on all large boilers, thus obviating the necessity of washing and brushing deposits off turbine blades, which was essential in some stations subjected to boiler foaming and priming at high ratings.

Single-phase transformers are giving place to three-phase units, and an imposing one was on view in the General Electric works at Toronto of 36,000 kVA, 230,000/11,000 V, weighing 325,000 lb. Overhead distribution is gradually being replaced by underground cables in large cities and towns, but in Canada it is everywhere adopted for transmission and distribution; having regard to the large areas of supply it is doubtless the only economical system.

In order to broaden one's outlook and to be able to view electrical developments generally, in proper perspective, a tour such as I have enjoyed is heartily recommended.

The Cooling of Electric Lift Motors

A method of cooling the motors of electric lifts which, owing to frequent starting and stopping, are subject to overheating unless they are of large size and well ventilated, is described in a recent issue of our German contemporary *Electrotechnische Zeitschrift*. The plan described is automatic in action and embodies means for the starting up of a fan whenever the temperature of the motor reaches 60 deg. C.; when 80 deg. C. is attained an alarm signal is set in motion, while if the temperature reaches 85 deg. C. the lift control gear connections are automatically broken.

Progress at Wolverhampton

An extensive rural development scheme is one of the leading features

ONE does not naturally associate the more pleasing aspects of rustic life with the Black Country, but the 92½ sq. miles of Wolverhampton's rural area is certainly typical of what is best in the English country side.

The area's economic value to the Corporation Electricity Department is not on the same level. The population density is only 175 and the number of dwellings 44 per sq. mile, and it is to the revenue obtained from the other 13½ sq. miles of urban character (with its population of 140,000) that the 16,000 inhabitants outside the borough owe their enjoyment of the benefits of electricity.

Wolverhampton Corporation fortunately took the long view that a quick return on capital outlay was not the goal of electricity supply; in 1925 it obtained powers to supply 34 sq. miles beyond its local government boundary, and by 1929 had constructed a network there of 24 miles of high-voltage and 23 miles of low-voltage lines and cables.

The present scheme, which has just been completed, was authorised by Special Order in 1928. The layout includes an overhead ring main near the extremities of the area with interconnectors to a second ring main nearer the centre of supply. The switching has been arranged to afford as far as possible alternative supplies to all parts of the area, so that with the exception of a few isolated cottages, supplies are available to every farm and house with a minimum cost of connection.

The "Wishbone" Bracket

The extended high-voltage system, comprising forty-three miles of overhead lines and two miles of cables supplied from three feeding points, is insulated for 11 kV, but for the time being is operated at 6.6 kV. The overhead conductors are of steel-cored aluminium erected on single wood poles with a normal span of 400 ft. During a recent visit to the area we were much impressed by the merits of the original "wishbone" bracket—a method of construction that allows equal spacing of the three conductors, no two conductors being in the same vertical or horizontal plane; birds are unable to perch on it, thus eliminating a common cause of overhead line trouble. The field cost of the lines incorporating this device works out at £320 per mile, the slight additional expense of the bracket being more than offset by the saving in time in pole dressing.

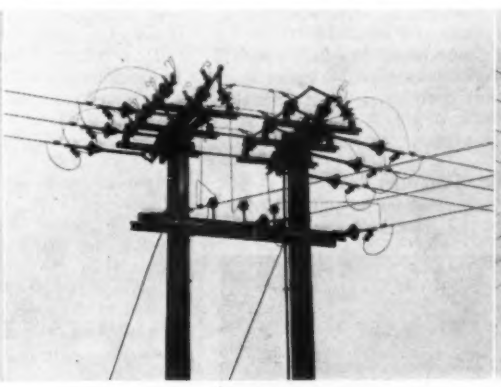
The bracket channels are cut and welded to pattern, and apart from the small bolt securing the two members, two bolts only are needed to fix the arm to the pole. Where the angle of the line exceeds that which can be carried by a standard 2,000-lb. pin, considerable saving has been effected by fixing duplicate wishbone brackets taking half the strain on each of the two insulators.

Deviations from the triangular formation have been made on angle make-off, section, and terminal poles. For the first, vertical formation has been adopted, and at sections, "H" poles have been erected. Single terminal poles have been used except when "H" poles are necessary to support a relatively large transformer. Earthing has been carried out at every pole by 8 in. by ⅝-in. "Copperweld" earth rod.

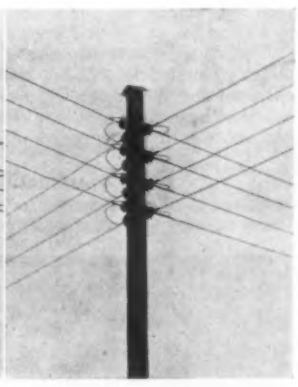
Erecting a pole by shear-legs

The low-voltage distribution system includes twenty miles of 400/230-V overhead lines and 1.25 miles of cable. The overhead construction is on conventional lines, embodying "D" irons and shackle insulators. Every care has obviously been taken to make these distributors inconspicuous, and we were particularly struck with the manner in which one very picturesque village is supplied by a barely visible overhead line erected along the backs of the houses. The services are of 0.0225 brown "Maconite," making a neat job.

Typical double wishbone angle pole

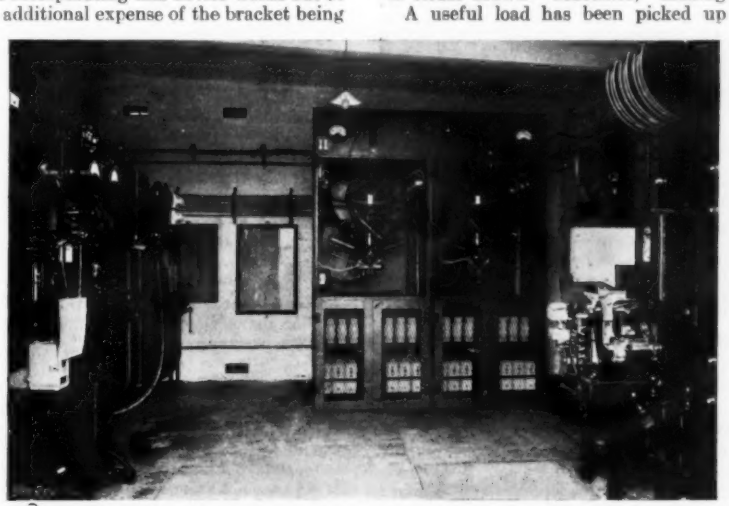


Air-break switches in ring main with tee for local transformer



A four-way low-voltage line

A useful load has been picked up from the several large country houses and estates which have substituted the Corporation supply for their private plants. Scott-connected transformers reduce the voltage to that for which the wiring was originally installed. The policy here and throughout the area is to make a connection wherever possible.



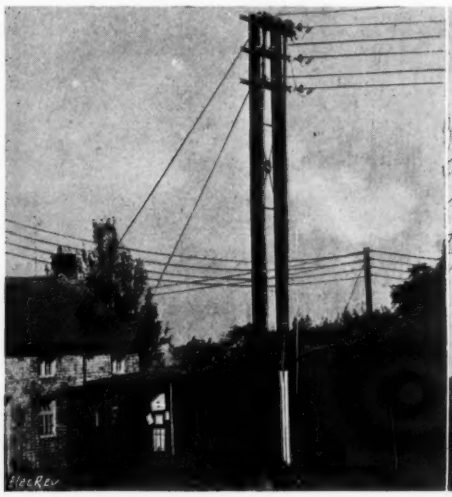
A mercury-arc rectifier sub-station for the trolley buses

Transforming Centres

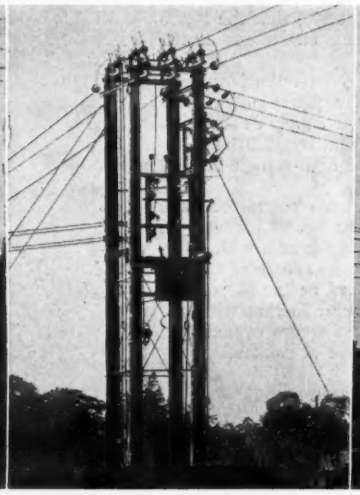
In the extended area there are fifty-two transforming centres. The short-circuit values (which have been methodically

worked out and recorded) are not high in these outlying parts, and so pull-down switches with renewable silver fuses have been used for high-voltage transformer control in most cases. Porcelain cut-outs housed in a galvanised frame attached to the transformers protect the low-voltage lines. Transformers are suspended from channels by hooks. They are chiefly of 25 kVA or less and of the English Electric Co.'s make, but there are some of 50 kVA by Ferranti, Ltd. Since the start of the scheme, early in 1931, forty outdoor transformers have been installed.

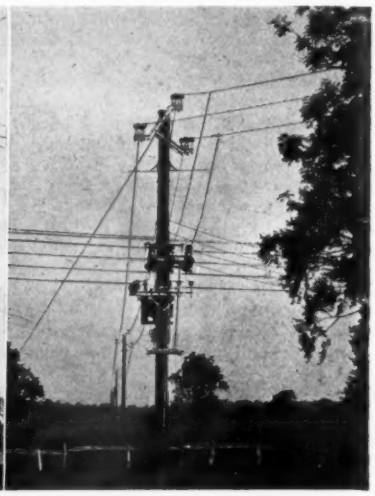
Air-break switches are mounted horizontally on the ring main system, and an " H " pole is erected parallel to the line



Double-circuit line and steel kiosk



Switching station at Chillington



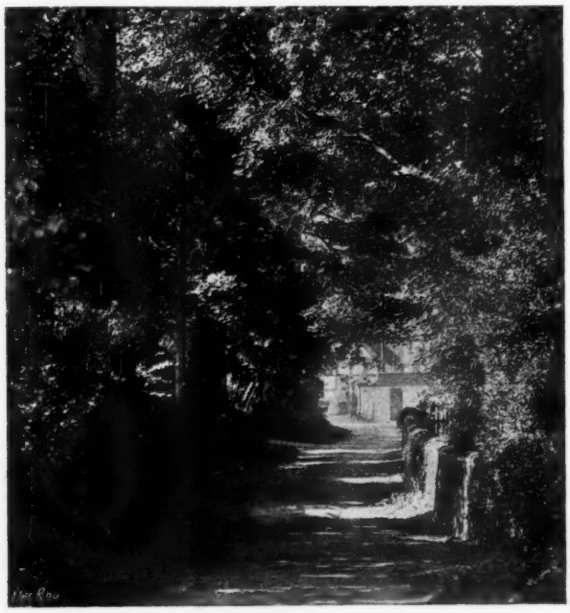
Double wishbone angle pole with pull-down switch and transformers

with a switch at the top of each pole, giving alternative feeds to a spur line or a transformer.

The capital cost of the rural scheme under the 1928 Special Order amounted to £27,550, and an unemployment grant was obtained for the work, which has been carried out entirely by direct labour under the supervision of Mr. T. A. G. Margary, borough electrical engineer and manager.

Reconstruction Schemes

Almost all the switchgear for the sub-stations and kiosks in the rural area was obtained from the 160 6-kV sub-stations in



Inconspicuous overhead distribution in a picturesque lane

the industrial area in which the switchgear is being reconstructed to meet the heavier short-circuit conditions now obtaining. A new switch-house is being built at Commercial Road power station to accommodate thirty-seven new metal-clad units with a rupturing capacity of 500,000 kVA. In existing sub-stations with a ring-main feed two of the existing trucks will be replaced by oil-immersed ring isolators, only the transformer switch being reconstructed for the higher duty.

The gear replaced by the isolators will be brought up to the required capacity and re-erected in the more remote sub-stations. The " zoning " of switchgear in this way will make it necessary to purchase only twelve new switches.

Another important piece of reconstruction, which will be finished this year, is the change over of the old d.c. system to a.c. This involves the replacement of sixty miles of cable and 8,698 h.p. of motors (out of a total of 53,850 h.p.), and affects 4,335 consumers. The whole of this work is being done by the Department. Since 1930 some seventy transforming stations have been put up, making the total now 200, and sixty-two miles of mains have been laid (21 per cent. increase) bringing their aggregate mileage to 357.

This constructional activity has been accompanied by a remarkable growth of load. During the past two years the number of consumers has increased by 62 per cent. to 23,579, bringing the total kW connected to 79,332 (54 per cent. more). At the same time the output has risen by 13.4 per cent. to 89,450,000 kWh; but for the industrial depression there is ample evidence that it would have been 95 million. The number of kWh sold was 85.3 million (15.48 lighting and domestic, power 68.9, and street lighting—sixty-four miles—0.94). The m.d. last winter was 24,700 kW, and the load factor 41.34 per cent. The kWh per head was 550.

Some 20,000 of the 33,000 premises in the borough are connected to the system; more than 75 per cent. of the premises not supplied are on the route of the mains.

Assisted Wiring

This position would not have been possible but for the pursuit of an energetic policy of load building. The most important aid to this has been the assisted wiring scheme, which was inaugurated in June, 1930. This scheme provides for a minimum of three and a maximum of eight lighting points and one plug point. The surface wiring with tough rubber-insulated cable is carried out by the Corporation's staff at an average cost of 15s. 4d. per point and financed by loan. There are 7,400 assisted wiring consumers to date.

The kWh sold per consumer per annum under the scheme averages 134 in the town area and 81 in the rural area. In the latter little headway would have been made without the assisted wiring scheme, of which 60 per cent. of the consumers have taken advantage; in one typical village 67 per cent. of the dwellings are connected, this being 90 per cent. of the total possible on the route of the mains.

The tariff is 4½d. per kWh plus 2d. per kWh which was estimated to pay off the installation cost in ten years, but experience so far shows that the period will be reduced to five or six years. A rebate of ½d. per kWh is allowed in kind, *i.e.*, in the provision of a limited number of new lamps to encourage consumers to maintain the maximum number of points in service. Small appliances can be purchased from the Corporation and paid for in weekly instalments.

Arrangements for hire and hire-purchase have been in operation for twenty years for ordinary consumers. The two-part tariff includes a standing charge based upon rateable value and a running charge at the reasonable rate of 0.6d. per kWh. The average price received for all purposes is 0.907d. per kWh.

Mr. Margary has added to his responsibilities by taking over last Saturday the Upper Penn district, formerly served by the Midland Electric Corporation for Power Distribution.

Prepayment Consumers. By E. J. Parnall, B.Sc., A.M.I.E.E.

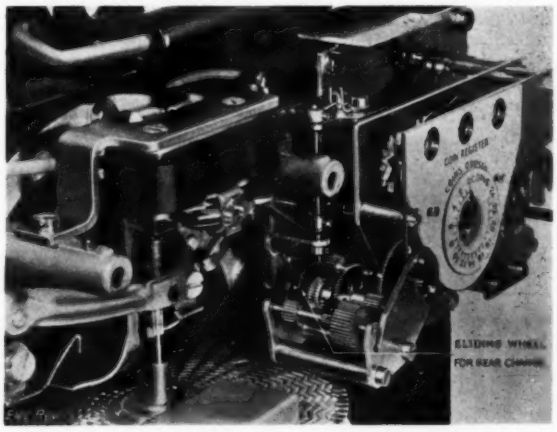
The use of double-tariff slotmeters

A VERY large proportion of new domestic business is being obtained from weekly wage-earning consumers on the prepayment system, and this can be attributed to the popularity of assisted wiring schemes. As an example of the increase in the number of prepayment consumers, the ratio of prepayment consumers to the total for a large undertaking was 25 per cent. in 1921 but 51 per cent. in 1931.

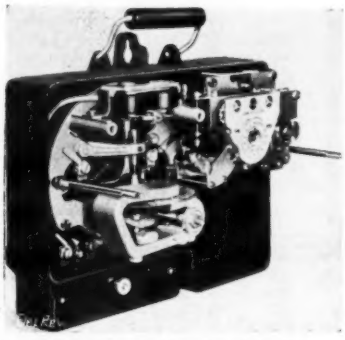
The payment for electricity through slotmeters calibrated at the "lighting rate" does not encourage its use for other purposes. Irons, and occasionally kettles, may be found connected to prepayment installations, but, generally, the use of heating apparatus is prevented by the comparatively high "unit" charge.

Owing to this and to the relatively high cost of prepayment meters (nearly 2½ times as much as ordinary meters), although the cost of collecting and accountancy is only one half that for quarterly consumers, prepayment consumers are necessarily considered less profitable.

Two-part tariffs and fixed charge collectors are not popular with small consumers or with supply authorities, as consumers may be unable to meet arrears, and in consequence cease to use the supply.



A "close-up" of a double-tariff meter, showing the sliding gear change mechanism



A "Metrovick" double-tariff prepayment meter

Fostering Consumption

It is estimated that the following average annual consumptions in kWh should be reached in four stages by the small slot consumer taking supply through a double-tariff meter which would differentiate between lighting and heating appliances: Lighting only, 80; lighting and iron, 120; lighting, iron, and kettle, 230; lighting, iron, kettle, and small cooker, 900—a not unsatisfactory total.

With a meter of this type the consumer can check the running costs of any appliance for himself, and will not be dismayed to find that his coin is spent in an unduly short period when an appliance is used, as occurs with a slotmeter having only one rate or working on the principle that part of the unit price is fixed charge.

In a recently introduced double-tariff meter* a simple magnetically operated switch alters the ratio of gearing so that the coin is expended at a slower rate when an appliance is connected than when lighting only is used. There is only one kWh dial, but a fixed relationship exists between the amount of money collected and total kWh supplied which determines the number of kWh supplied at each rate.

It might appear that an astute consumer would use an appliance during lighting hours and yet pay no more than he would pay for his lighting only. By choosing a suitable ratio between primary and secondary rates and a convenient loading (say, 350 to 400 W) below which the secondary rate will not operate, this contingency is obviated.

It is unlikely that the consumer would change his habits and use an appliance only during lighting hours, with the idea of getting his lighting at the lower rate, but even so, it is computed that not more than 10 lighting kWh a year would be obtained at that rate.

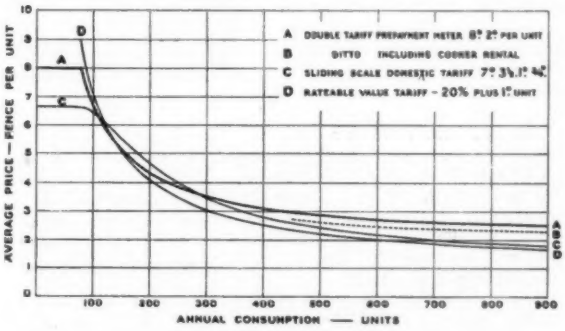
The prepayment primary rate is usually a penny per kWh above the primary rate charged to quarterly consumers, and on that assumption comparative curves are given which show how closely the results to be achieved by a double-tariff prepayment meter compare with a common sliding scale or rateable value tariff applied to a four-roomed house at prices commonly charged to domestic consumers in rural areas.

Rebates for Large Consumers

Generally speaking, the development of domestic uses of electricity other than lighting will not materially affect the peak, and it will be found that the cost curve, for any normal undertaking, or any undertaking purchasing energy in bulk on a demand and "unit" basis, follows the contour of the revenue curve very closely.

As the consumption of electricity increases it would be advisable to institute a system of cash rebates, so that the secondary rate should be reduced to correspond more closely with the low rates which the undertaking charges to ordinary consumers.

The rental of small cookers could be included in the secondary rate. Dotted curve B shows the average price per kWh received by the undertaking after making allowance for cooker rental.


A DOUBLE TARIFF PREPAYMENT METER 8d. 2d. PER UNIT
B DITTO INCLUDING COOKER RENTAL
C SLIDING SCALE DOMESTIC TARIFF 7d. 3½d. 2d.
D RATEABLE VALUE TARIFF – 20% PLUS 1d. UNIT
AVERAGE PRICE — PENCE PER UNIT
ANNUAL CONSUMPTION — UNITS
0 1 2 3 4 5 6 7 8 9 10
100 200 300 400 500 600 700 800 900

A comparison of tariffs

* ELECTRICAL REVIEW, August 12th, p. 224.

Some All-electric London Flats

THE last word in up-to-date residential accommodation is afforded by a large block of flats which has recently been opened at 29, Abercorn Place, St. John's Wood, N.W. Here a kind of communal service is combined with provision for individual needs and electricity is freely used for lighting, heating, cooking and other purposes.

The flats were designed by Mr. D. L. Solomon, B.Sc., F.R.I.B.A., and built by Messrs. Ford & Walton. The electrical installation was carried out by Messrs. Tyler & Freeman, to whom, with Mr. A. Patrikious, who is in charge of the electrical equipment, we are indebted for the following notes.

The supply is taken from the St. Marylebone Borough Council, which has put in a general distribution panel for a portion of the district. The main board is of the ironclad industrial pattern with switch- and fuse-gear made by the Midland Electric Mfg. Co., Ltd. The tenants' lighting is controlled by two 200-A triple-pole and neutral switch-fuses and there is a separate 200-A t.p. and neutral switch-fuse for the kitchen and restaurant. The landlord's lighting and power is separately controlled and metered. All the cables are of Henley's v.i.r. type installed in heavy-gauge steel screwed conduit.

The wiring is in Henley's twin metal-sheathed system and is concealed. The lighting fittings and lamps in the flats are, in the main, products of the General Electric Co., Ltd.

The tenants are given a choice of "Berry," "Belling," "Revo" or "Magnet" fires and each kitchenette is fitted with a 3.5-kW "Magnet" cooker or a 2-kW "Revo" breakfast cooker. The tenants enjoy an "all-in" rate, consisting of a fixed kW charge plus ½d. per kWh.

Altogether there are 900 pendant points, 461 lighting plug points, 460 radiator points, and 60 vacuum cleaner points in the building. The whole of the cooking equipment is of G.E.C. manufacture. There is a large group of water heaters by Jackson Boilers, Ltd., and a "Frigidaire" refrigerator. Five Penrose lifts have been installed. Some illustrations of the flats appear on page 491.

Tobacco Curing by Electrical Methods

Further investigations in Australia

LAST year initial experimental work was carried out by the State Electricity Commissioners of Victoria to discover whether electricity would have special advantages in the curing and drying of tobacco. A report was issued (ELECTRICAL REVIEW, September 4th, 1931, p. 356) in which it was shown that the electrical method was a technical success but that the season was too limited in time and scope to justify any general recommendations. Further investigations this year have effectively demonstrated the superiority of the electric furnace.

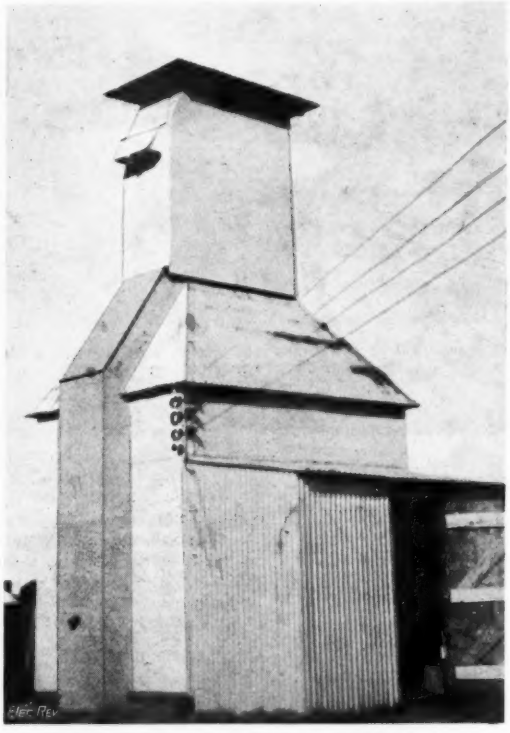
The optimum curing temperature with an average outside temperature of 65 deg. F. is from 80 to 90 deg. The higher figure reduces the time taken to reach standard colour by 17½ per cent. for ripe coloured leaf, and by 13 per cent. for ripe uncoloured leaf, but radiation losses are increased by 60 per cent., and 40 per cent. more electricity or fuel is required. Fluctuations in temperature are far more important, as smudging of the leaf is caused by a reduction of five deg. in a saturated atmosphere; thermostatically controlled electric heating obviates this trouble.

A Steady Humidity

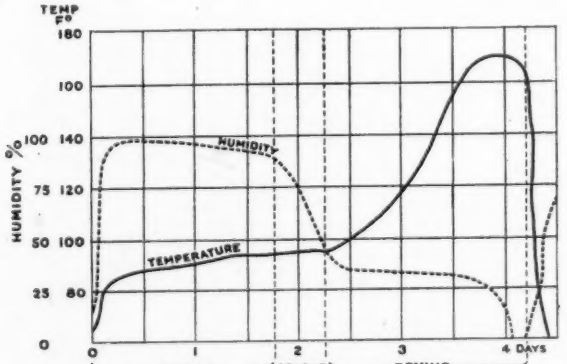
A steady humidity can be obtained by an electrical relay and magnetically controlled valve operated by an indicating hygrometer. Water drips on a protected heating element, which generates enough steam to compensate for losses in humidity due to the opening of doors, air leakage from the ducts, &c.

One of the advantages of the electric kiln is that fresh air can be introduced through the preheaters of a fan system without varying the temperature or causing more than a momentary drop in humidity. This improves the colouring of the leaf, as a maximum of 2 per cent. only of CO_2 is permissible without appreciably retarding the ripening process. For a kiln containing 600 to 700 sticks of leaf, a supply of fresh air is needed, increasing to 400 cu. ft. per hour towards the end of the curing process. For drying, the highest temperature obtainable without scorching the leaves is economically desirable; the limit is 180 deg. F.

A description of the experimental electric kiln appeared in the earlier report. Heat losses through uninsulated walls were heavy, and it is tentatively suggested that 4-in. studs covered with galvanised corrugated iron outside and plain galvanised iron inside, with sawdust in the intervening space, will meet requirements. It is not fireproof, but it is the inflammability of the dry leaf rather than the materials in the walls that constitutes the risk, and as fire-resisting insulating walls would suffer severely from the combustion of the contents of the kiln, a more expensive wall is thought to be unjustifiable. In a forced air-circulation kiln the height is unimportant, but for a given drying space radiation losses are least when the building conforms in shape to a cube. The kiln capacity increases as the cube of the length of the side and the superficial area (and losses) only as the square; doubling the principal dimensions of a kiln halves the heat losses per lb. of product, while increasing its capacity in 4-ft. leaf sticks eight times.



Arrangement of the kiln for the final test



Typical temperature and humidity curves

Air Circulation

In a flue-heated kiln, a large proportion of the applied heat is by radiation rather than convection, giving a higher temperature and a lower humidity at the bottom. If the air is heated in another chamber and circulated through the kiln, these conditions are uniform, and the electric kiln was altered by the installation of the elements in an enlarged section of the circulation duct under the floor.

For curing, about six changes or air per hour are adequate. For drying, larger fans are needed than for curing alone. A 16 ft. by 16 ft. kiln (4,000 cu. ft.) calls for 1,700 B.th.u. per min.; the circulation of 2,000 cu. ft. of air per min. requires a ½-h.p. motor.

In the experimental kiln the heating units consist of nine 7 ft., 15-kW tubes, each controlled by a separate switch; six are also controlled by a thermostat which regulates the temperature within ± 1.5 per cent. during the curing period. For a 16 by 16 ft. kiln. 30 kW would be ample.

The heat of the outgoing air preheats the incoming air; with the atmosphere at 68.5 deg. and the internal (drying) temperature at 165 deg. the incoming air is raised to 130 deg. The area of the heat-exchanging surfaces is 340 sq. ft., made up of eighty-six 3-in. tubes, each 5 ft. long, but about half their area is sufficient with the recirculating method.

The Curing Period

Curing may take from eighteen to seventy-two hours, depending upon the season and maturity of the leaf. After loading the kiln, the fan is started and one or two of the heating tubes switched on with the thermostat set at 75 deg. F., rising by a few degrees at hourly intervals to 90 deg. (80 deg. for the latter half of the season). For colour fixation the temperature is raised by stages of not more than 2 deg. every three hours to 130 deg., and finally to about 170 deg. for drying. The average consumption of electricity per lb. of tobacco was 3.41 kWh. If the wall insulators were twice as thick and the dimensions of the kiln were doubled, the consumption would be reduced to 2.13 kWh per lb.

The conclusions reached as the outcome of the two seasons' experimental work with electricity are that: (1) fire risk is almost completely eliminated (the burning of over 50 tobacco kilns, valued at £200 each as an average, in Victoria last season was reported in the public Press); (2) the best operating conditions can be consistently reproduced; (3) night attendance is unnecessary; (4) energy consumption may be estimated at 2.75 kWh per lb. for full-scale working; (5) for curing alone (as distinct from drying) the consumption is about 0.6 kWh per lb. and for air circulation 10 kWh per day, of twenty-four hours; (6) even where wood fuel is very cheap, the use of electricity at 1½d. per kWh is definitely advantageous.

Electricity in the Hospital

A new electrical apparatus for the treatment of cancer is badly needed at the Central London Throat, Nose and Ear Hospital in Gray's Inn Road, W.C.1. The old apparatus—one of the first to be installed in England—is now worn out, while additional X-ray apparatus is required to keep pace with current developments in that department of the Hospital's work. An appeal for donations to meet the £250 required is being made by the committee.

Subway Lighting in Paris

Automatic control by means of photo-electric cells

ABOUT a year ago a new subway was constructed under the Avenue Foch at the Porte Dauphine, Paris, by which fast-moving transverse traffic can come under, rather than across, the Avenue. The subterranean road, access to which is by inclines on each side, is 820 ft. in length and 42½ ft. in width, providing for two lines of traffic in each direction. The tunnel is illuminated by 242 lanterns set flush in the walls of the tunnel, at intervals of 6½ ft. and equipped with 500-W rectilinear-filament lamps.

The illumination was designed to meet two main requirements; first, that the driver of fast-moving vehicles should not find too great a difference between the light in the open-air thoroughfares and that in the underground roadway, and, secondly, that the tunnel should not be thrown into darkness by failure of the electricity supply. From the *Bulletin Télémécanique* we learn that the first requirement was met by the use of a photo-electric cell and contact galvanometer by means of which automatic contact makers are operated, switching the appropriate lighting arrangements into circuit.

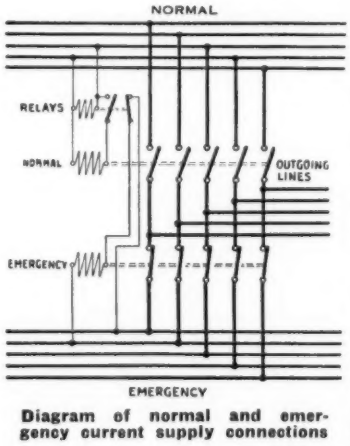


Diagram of normal and emergency current supply connections

Permanence of lighting was ensured by installing two different 110-V, a.c. systems, one single-phase and the other two-phase. If both circuits should fail traffic through the tunnel can be brought to a standstill by signals operated by current from a battery.

All the lamps as well as the signals and one of the electric ventilating fans can be supplied from the two-phase circuits. The motor for a fan is fed from a separate circuit. Under normal conditions the single-phase system feeds half of the lamps by means of the all-night supply circuits.

Should a breakdown occur on the two-phase circuit, the single-phase system feeds the thirty-two night lamps, which also are fed from the battery system. When the latter has to be brought into use, the traffic is held up by the automatic "stop" signals. The two-phase circuits provide normal lighting, while the third is kept as a standby in case of emergency.

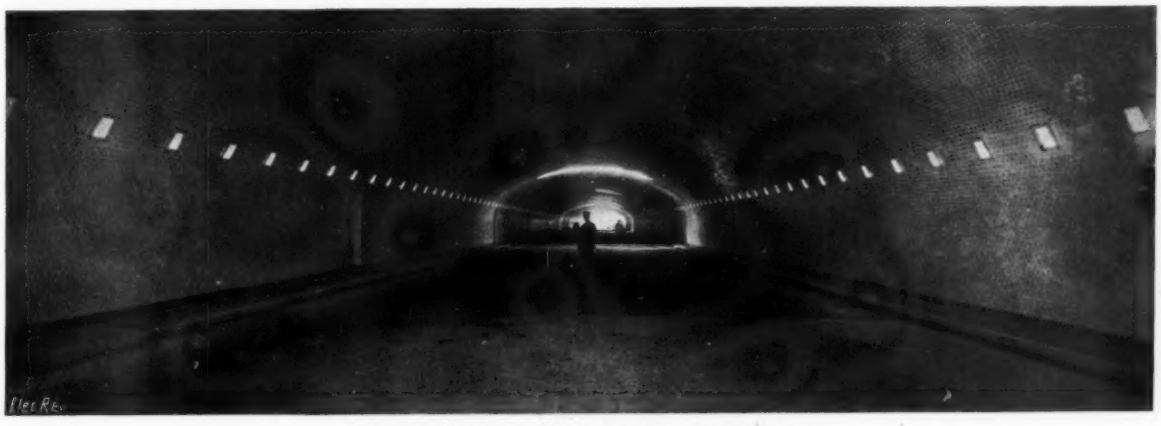
Automatic Regulation

The change-over from the two-phase to the single-phase system or from a defective two-phase circuit to the standby circuit, is effected automatically by a group of contact-maker reversers so electrically and mechanically interlocked that two of the circuits cannot be accidentally left in operation at the same time. The maximum-current relays—one for each of the phases and for each of the contact makers—are so designed as not to be actuated by the temporary passage of ten times normal current when the power is switched on.

The degree of lighting in the tunnel is regulated automatically in accordance with that outside. The whole of the installed lamps are arranged in four groups, each having a separate control, which enables the following variations in the tunnel lighting to be made:—

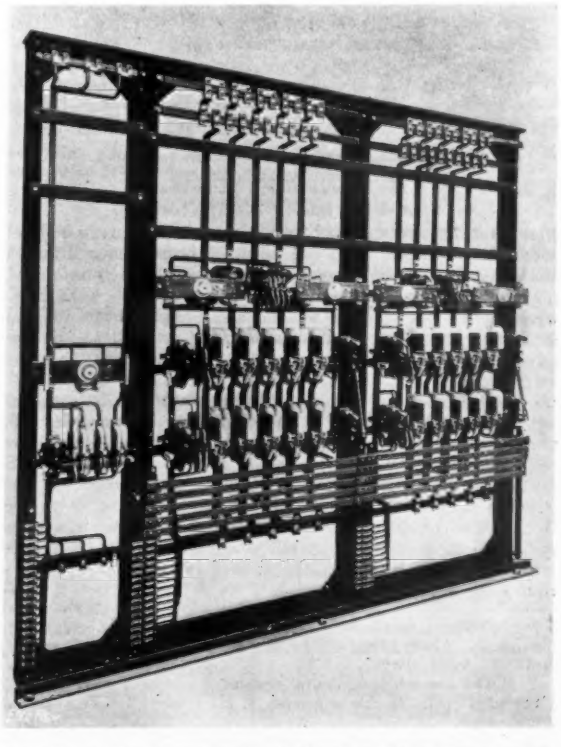
Exterior Lighting.	Tunnel Lighting.	Light capacity in lux.
Full sun	All lamps burning (242)	135
Ordinary weather	One out of two lamps burning (122)	60
Cloudy dull weather	One out of four lamps burning (62)	32
Night	One out of 8 lamps burning (32)	15

The "full-sun" lighting load equals 121 kW or twenty times that required for the night lighting of a road of similar width.



A view inside the tunnel showing the concealed lamps

The all-night lamps burn continuously. The other 210 lamps are connected to a triple-pole contact maker controlled by a relay, the opening and closing of which are actuated by the current variations recorded by a contact galvanometer known as an "heliotère." The moving parts of the galvanometer are linked up to a circuit which includes a selenium cell enclosed in a diffusing globe mounted on the top of a lamp-post in the open air, and connected to the terminals of a potentiometer taking current from a 24-V battery. Any variation in solar lighting causes an alteration in the cell resistance and consequently a movement of the needle of the galvanometer, the latter and a series of contacts in turn closing or opening the lamp circuits.



One side of the incoming single-phase and two-phase current switchboard

Armoured Single-core Cables. By E. A. Beavis

The heating effects of losses in the wire protection

FOR transmission above 60,000 V it has become necessary, owing to the mechanical limitations of three-core cables, to employ single-core cables. Disadvantages of single-core cables would be greatly mitigated if these could be used in the armoured state. Copper tape does not form a truly adequate protection, and the general use of non-magnetic material is prohibitive on economic grounds, but tests by other investigators* on higher voltage single-core cables (with their comparatively lower current loading and increased thickness of dielectric) indicate that the extra losses due to steel wire armour might not prove excessive, particularly if the length of lay of the wires was somewhat increased.

These tests also show that, in spite of the magnetic armour, there is appreciable increase in the general flux with increased spacing, making it advisable for these cables to be laid reasonably close together.

I am indebted to Messrs. Siemens Bros. & Co., Ltd., for permission to publish the following results.

Types of Cable Armour

A direct comparison of the losses produced by various types of wire armour indicates their influence on the current-carrying capacity of the cable for a limiting temperature rise.

The types of armouring adopted for this experiment are indicated in Table 1; the cable made use of was of 0.2 sq. in. section, p.i.l.c., having an insulation thickness of 0.62 in.

TABLE I.

Cable No.	Type of Armouring.
A ...	60 × 0.128in. copper wires, each separately tarred.
B ...	60 × 0.128in. galvanised soft-steel wires, each separately tarred.
C ...	60 × 0.104in. galvanised soft steel wires each separately tarred and taped to 0.128in. dia.
D ...	71 × 0.104in. galvanised special steel wires, each separately tarred.

Of these A is purely non-magnetic, B represents normal practice, C is ordinary wire armour with the wires separately insulated, while D is special low permeability wire.

Cable-heating Tests

Cables, identical in type, in 50-yd. lengths, tied together in triangular formation, were buried in the ground at a depth of a few inches to avoid the effect of promiscuous draughts and other local variations of temperature. Three-phase loading current was applied for some hours at each test. Tests were carried out on both bonded and unbonded sheaths and armouring, but no doubt in operation the bonding will be considered necessary.

TABLE II.
CURRENT LOADING TESTS S-C. ARMOURED CABLES.

Cable.	Connection.	Core Current Amp.	Loading time. hr.	m.	Temperature deg. F. Conductor.	Sheath.	Basic.	Temperature rise deg. F. Conductor.	Sheath.	Ratios. t_c/I_cA. (1).	t_s/I_sA. (2).
A	Bonded one end only.	300	5	3	80.7	64.2	48	32.7	16.2	1.0	1.0
B	Ditto ...	300	5	37	100.4	81.0	50	50.4	31.0	1.52	1.89
A	Ditto ...	400	7	9	137.6	96.6	55	82.6	41.6	1.0	1.0
D	Ditto ...	300	7	20	113.1	90.6	63	50.1	27.6	1.14	1.24
A	Bonded both ends.	300	12	3	102.7	80.7	52	50.7	28.7	1.13	1.28
B	Ditto ...	250	11	50	94.5	80.2	53	41.5	27.2	1.37	1.78
C	Ditto ...	300	12	0	107.4	86.0	50	57.4	36.0	1.32	1.65
D	Ditto ...	300	8	0	117.7	97.7	64	53.7	33.7	1.22	1.53

* Loading too short a duration, steady temperature not attained.
(1) Temperature rise for conductor, with equal copper loss. / Temperature rise of "A" (unbonded)
(2) Ditto for lead sheath (approximately equivalent to R_e/R).

In the first tests (Table II) the two initial current runs were too short for a steady final temperature to be attained, but they are in themselves approximately comparable. The temperature rise of the cable is dependent upon the total loss to be dissipated, and this consists of the ohmic loss in the conductor (including skin and proximity effects), and those losses that are dissipated only in the sheath and armour respectively. For practical purposes, since the thermal resistance between lead sheath and armour is almost negligible compared with the total thermal resistance, they can be considered as a combined sheath.

If the thermal resistance of the insulation per centimetre be denoted by S, and that for the remainder of the cable to ground be G, then the total thermal resistance is represented by S+G. Calling the conductor loss H, and the total sheath loss h, (H+h) G will be the temperature rise of the sheath, and (H+h) G+H.S will be that of conductor. On the assumption that the sheath losses for the non-magnetic cable A in the unbonded state are negligible, the ratio of temperature rise of the sheath of any cable to that for cable A, for the same C^2R loss in the conductor, will indicate the effective resistance of that cable. The ratio of the conductor temperature rises will show the true heating effects of the total cable losses, thereby affording the actual permissible loading current as compared with the non-magnetic type. The question of dielectric loss has not been considered here; this is common to all types, and only affects final value of permissible conductor temperature.

Cable-loss Tests

In order to check the approximate values thus obtained for the various cables, and also to ascertain the true loss in the case of the non-magnetic type A for correction purposes, measurements of the a.c. losses were carried out, with the following results:—

TABLE III.
MEASURED ALTERNATING CURRENT LOSSES AT 50 CYCLES (C^2R_c).

Cable.	Core Current.	Direct Current Loss (C^2R).	Unbonded.	Bonded.	Loss Ratio R_c/R. Unbonded.	Bonded.
A ...	200	216	236	278	1.092	1.286
	300	486	543	629	1.118	1.295
B ...	200	216	325	382	1.505	1.778
	300	486	910	883	1.872	1.817
C ...	200	216	286	350	1.325	1.621
	300	486	776	848	1.597	1.745
D ...	200	216	245	319	1.135	1.478
	300	486	570	725	1.172	1.491

It will be observed from these figures that the sheath loss for the non-magnetic cable A under unbonded conditions is approximately 10 per cent. of the copper loss, and so the ratio figures given in Table II must be increased in this proportion to indicate true values comparative to the copper loss alone.

Current-loading Factors

The reduction in current required to prevent a limiting temperature being exceeded is entirely dependent upon the ratio of S to G, which varies with the depth of laying.

The cable with negligible sheath loss will have a conductor temperature rise represented by t_1=H (S+G), while that for the armoured cable will be t_2=H(S+G)+hG. Hence, $t_2/t_1 = 1+hG/H(S+G) = 1+G(R_e-R)/R(S+G)$, since $H=C^2R$, and $h=C^2(R_e-R)$. If the ratio of the thermal resistances S/G=x, then $t_2/t_1 = \frac{S+G.R_e/R}{S+G} = \frac{x+R_e/R}{x+1}$. For equal temperature rises the current ratio will therefore depend upon the value of x, and $C_2/C_1 = \sqrt{\frac{1+x}{x+R_e/R}}$

TABLE IV.
CURRENT LOADING FACTORS. CABLES BONDED AT BOTH ENDS.

Cable.	Ratio t_2/t_1. (a).	Current Ratio C_2/C_1. (b).
A	1.19	0.92
B	1.44	0.84
C	1.39	0.85
D	1.29	0.88

(a) Ratio of conductor temperature rise, including sheath loss to rise for copper loss only—for equal currents.
(b) Ratio of current including sheath loss to current for copper loss alone—for the same conductor temperature rise = $\sqrt{t_1/t_2}$.

For normal conditions of laying the thermal resistance to ground is greater than that of the insulation, the ratio G/S varying from about 1.5 to 2. Taking the maximum figure and assuming that the extra losses are 100 per cent. of the conductor loss, (*i.e.*, $R_e/R=2$), as a safe value, then the loading factor will be $C_2/C_1 = \frac{\sqrt{1+0.5}}{0.5+2} = \sqrt{\frac{3}{5}} = 0.77$. Thus the current reduction is of the order of 20 per cent. for ordinary wire-armoured cables. With wire of low magnetic permeability, the reduction is likely to be less than 10 per cent.—very little greater than that occasioned by entirely non-magnetic material.

* 1. "The Use of Single-core Lead-covered and Armoured Cables for Alternating Currents." Prof. W. Cramp, I.E.E., Vol. 63, April, 1925.
2. "The Use of Single-core Armoured Cables for Alternating Currents." G. M. Harvey and A. H. Busby, I.E.E., Vol. 63, April, 1925.
3. "Sheath and Armour Losses in Single-core Cables for Single-phase and Three-phase Transmission." R. A. Brockband and J. K. Webb, I.E.E., Vol. 67, March, 1929.

Profitable Soil Warming. By F. H. Fullerton

Successful experiments conducted with electric hotbeds in Western Canada

THE use of electric hotbeds has passed beyond the experimental stage in Western Canada, where electric soil heating has been definitely proved to have advantages over the old style of manure bed.

The British Columbia Electric Railway Co. has carried out tests with a simple installation consisting of the regular hotbed frame with lead-covered heating cable buried at a depth of 6 in. in the soil. The cable used is a special American General Electric product, consisting of a No. 19 " Nichrome " resistance wire, cambric covered and enclosed in a lead sheath, with a 3/64 in. wall and of approximately ¼ in. outside diameter. It has a resistance of 0.501 ohm per foot and dissipates approximately 6¾ W per foot. A 60-ft. length of cable was used in a 6-ft. square bed and supplied from a 1,100-V service. The temperature of the soil is maintained at 70 deg. by a thermostat, and it is estimated that from 4 to 6 kWh is used every 24 hours. A metal screen protects the cable from cultivating equipment.

Comparative Tests

For comparative purposes a manure hotbed of exactly the same size was arranged immediately adjoining the electric bed. Both beds were arranged on the same day with similar plants. After twenty days tomato plants in the electric hotbed were 9½ in. in height, while the plants in the manure bed were only 1¾ in. in height. Growth in the manure bed was retarded by an exceptionally cold spell, which did not affect the electrical installation

While perhaps scarcely a fair comparison, the test demonstrated yet another advantage of the electric bed, and it is asserted that under most favourable conditions the old-fashioned system could not compete with electric soil heating. The tomato plants were good in colour and strength, despite the forcing. Other plants in the bed also made corresponding growth, but individual plants require individual temperatures, and this fact must be carefully studied by agriculturists in order to secure the maximum results.

Later, an experimental bed was installed at North Vancouver. This is a much more elaborate installation than the first, and is also under thermostatic control.

Mr. Leong, on whose property the original experiments were conducted, has purchased a further supply of cable for soil heating in a greenhouse, and also intends to experiment with the growth of cucumber plants to maturity in glass-covered frames through the medium of soil heat.

A comparison of tomato plants in an electric hotbed (left) and a manure hotbed (right) after twenty days' growth

Florists are becoming interested in the subject, and one is installing a soil-heating installation in his greenhouse in addition to the general heating system. A dealer is making a hotbed for the propagation of chrysanthemums from cuttings. Another florist intends to make a similar installation next season for violets and other small flowers in which he specialises.

Mr. J. C. Munro, the assistant sales engineer of the B.C. Electric Railway Co., points out that by throwing a switch plants may be hurried along at any time and at any speed desired. The cost of equipping a hotbed 6 ft. square is very small. It would require 60 ft. of the special cable used, which costs 12 cents a foot, in addition to a thermostat.

The advantages of electric heat over the older methods are summarised as follows:—The heating appliances can be quickly and easily installed, while it takes a great deal of time and labour to make manure beds. The heat can be turned off or on depending on the outside conditions, while the heating process of manure under a bed is practically continuous. A pure heat can be obtained on any part of the bed soil or air. Manure heat is steamy and carries with it gases that in large quantities are harmful to plant growth.

An electric hotbed at Vancouver, B.C.

An electric hotbed is more flexible. The gardener can force or retard growth at will, thereby fixing with greater accuracy the time of field planting. By simply shutting off the current the bed can be used as a cold frame. The equipment can be used for several years and can be put into operation at any time by merely turning a switch. Automatic control can readily be used to maintain any predetermined temperature.

If a gardener is careful to water electric hotbeds when needed in the early part of the day, so that the surface of the bed will be dry before the cool night temperature strikes it and condenses moisture around the plant, there should be very little need of ventilation. In fact, this should only be necessary to keep down excessive temperatures under a bright sun. Reducing ventilation in this manner will keep the bill for electrical energy at the minimum. Insulation is probably the most important factor in keeping costs down.

Possibilities of the System

Some idea of the importance of this development may be gained from the fact that the annual value of greenhouse products in British Columbia is over $6,900,000. The total area under glass in the lower mainland of Vancouver Island is 3,790,000 sq. ft. During the past eight years the area under glass has increased by 210 per cent. and the number of growers by 257 per cent.

On the subject of the proper temperatures, opinions vary, but it is widely considered that with 30 deg. ambient temperature a soil temperature of 50 deg. may be maintained, whereas with the ambient temperature at 70 deg. the soil may be maintained at about 80 deg. The thermostat should be embedded in the soil and should be adjustable to operate between 45 and 90 deg., and to cut in and out, so that it will hold the soil temperature within a range of 2 to 5 deg. The cable is installed in the hotbed by laying it in parallel loops from 6 to 8 in. deep in the soil. A layer of insulating material is placed below the bed, and for this purpose cinders or coke have been found satisfactory. Such an arrangement of cable in the bed gives a fairly uniform temperature at the surface and at root depths.

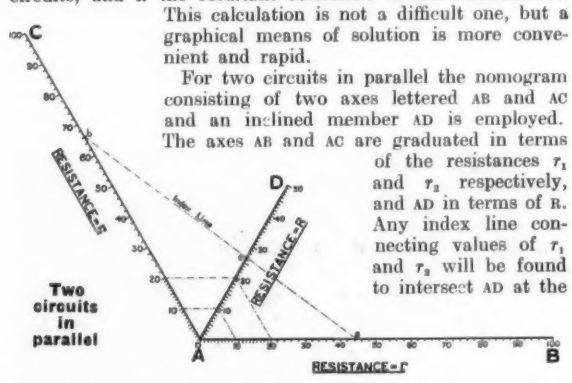
Research organisations in various parts of the American continent are now studying these problems. Meanwhile results from installations carried out on the Pacific Coast have proved satisfactory and have been found well within the economic limit with respect to the cost of installation and operation.

Parallel Circuits. By A. Alison, M.I.Mech.E.

THE equivalent resistance of two or more circuits in parallel is given by the equation :—

$$\frac{1}{R}=\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}+$$

in which r_1, r_2, r_3, &c., denote the resistance of the individual circuits, and R the resultant resistance of the combination. This calculation is not a difficult one, but a graphical means of solution is more convenient and rapid.



For two circuits in parallel the nomogram consisting of two axes lettered AB and AC and an inclined member AD is employed. The axes AB and AC are graduated in terms of the resistances r_1 and r_2 respectively, and AD in terms of R. Any index line connecting values of r_1 and r_2 will be found to intersect AD at the corresponding value of R that satisfies the above equation.

The axes AB and AC are drawn at any convenient angle apart, say, 120 deg., and AD is drawn to bisect the angle BAC. Next a suitable scale to which the resistances r_1 and r_2 may be denoted on AB and AC is chosen. The selection of the scale depends upon the magnitude of the resistances and the length of the axes to accommodate the range. In this instance the same scale must be employed on both axes, otherwise AD would not bisect the angle BAC. The figure illustrated was constructed with AB and AC 10 in. in length, and with the graduations inserted to a scale of 1 in.=10 ohms.

The scale on AD may be directly derived from those on the neighbouring axes, either by drawing projectors from AC parallel to AB to intersect AD, or by a similar construction from AB, making the projectors parallel to AC. The example shows that R has a value of 26.40 (*c*) when the resistances of r_1 and r_2 are 66 and 44 ohms respectively.

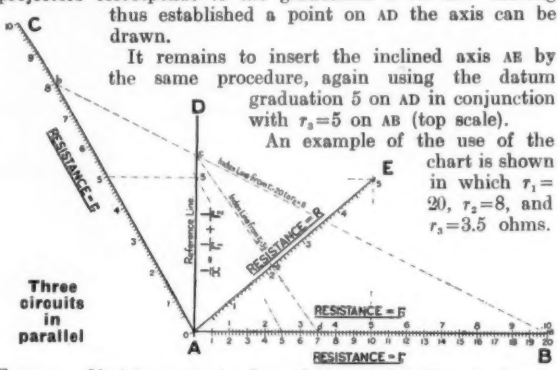
With three circuits in parallel, the introduction of a third circuit of resistance r_3 entails the employment of an additional axis, and the solution is accomplished in two steps.

Let $\frac{1}{r_1}+\frac{1}{r_2}=\frac{1}{x}$ then $\frac{1}{r_3}+\frac{1}{x}=\frac{1}{R}$

The numerical values of the variable X are not required, and in consequence the axis upon which they appear need not be graduated. By grouping the terms in pairs additional resistances r_4, r_5, &c., can be incorporated.

This chart is constructed by drawing the axes AB, AC at any angle with each other, say, 120 deg., as previously. AB bears two scales, namely, those of r_1 and of r_3. AC is graduated in terms of r_2. The intermediate axis AD must be placed to satisfy the sub-equation connecting the reciprocals of r_1, r_2, and X, and the following construction outlined on the figure will serve.

Any equal values of r_1 and r_2, say 5, are selected, and from graduation $r_1=5$ on AB (underscale), a line is drawn parallel to AC. Similarly, from the graduation $r_2=5$ on AC, a line is drawn parallel to AB. The point of intersection of the two projectors corresponds to the graduation 5 on AD. Having thus established a point on AD the axis can be drawn.



It remains to insert the inclined axis AE by the same procedure, again using the datum graduation 5 on AD in conjunction with $r_3=5$ on AB (top scale).

An example of the use of the chart is shown in which $r_1=20$, $r_2=8$, and $r_3=3.5$ ohms.

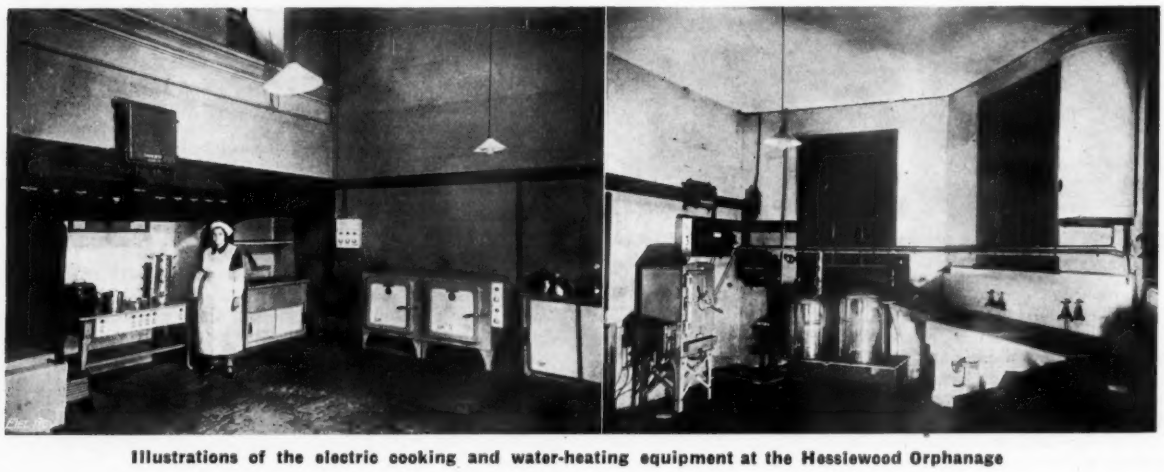
From $r_1=20$ (*a*) on AB (underscale) an index line is drawn to $r_2=8$ (*b*) on AC intersecting AD at point (*c*); point (*c*) is joined to $r_3=3.5$ (*d*) on AB (top scale), and the intersection at point (*e*) of the index with the axis AE denotes a value for R of 2.17 ohms.

Electric Cooking in a Hull Institution

HESSLEWOOD Orphanage is situated about five miles from Hull and accommodates from 150 to 200 children in addition to the staff. The original scheme was to use electricity for lighting only, but wiser counsels prevailed and electric cooking and water-heating apparatus has also been installed.

The cooking equipment (which has an aggregate maximum loading of over 80 kW) is all of the "Creda" latest mottled enamel type. The installation consists of a "Stott" boiler with copper finish, 4½ kW main, 1 kW by-pass; 20 and 30 1-gal. G.E.C. storage water heaters, thermostatically controlled with copper interiors, 3 kW and 4 kW respectively; three ovens, 24 in. by 24 in. by 24 in. internal dimensions, 18 kW; 4-ft. hot-cupboard with cast-iron hob, two carving wells and dish covers, low temperature elements, 3 kW; a six-plate boiling table, four 8 11/16 in. dia. rings 1.8 kW each, and two 7 in. dia. rings, 1.2 kW each, total 9.6 kW; a double-compartment grill and hot cupboard, each 14 in. by 16 in. by 7 in. interior dimensions, with nichrome-spiral elements on steatite formers, 7 kW; a 20-gal. tinned-copper stock-pot with nickel-plate external finish, 20 in. dia. by 30 in. high, 5 kW; a 30-gal. vegetable boiler and steamer, similar to the stock-pot but 40 in. high, 7.5 kW; a two-pan fish fryer comprising two c.i. pans for deep-fat frying, each 18 in. by 18 in. by 6 in., provided with drainage tap and removable wire basket and element clamped on the underside, 13.6 kW; and a steaming oven with inner chamber of tinned copper having a water compartment in the base heated by immersion type elements, 28 in. wide by 24 in. deep by 58 in. high, 5 kW. All these appliances are fitted with three-heat switches and pilot lamps.

At the opening ceremony, in which the Lord Mayor and Lady Mayoress took part, the outside of the buildings were floodlighted. Commander L. Stromberg, who presided, congratulated the contractors, Messrs. Napier & Wheeldon, and Mr. J. N. Waite, the city electrical engineer, on his tariff, which includes a unit charge of 0.5d.



Illustrations of the electric cooking and water-heating equipment at the Hesslewood Orphanage

Small Motor Applications

The "Cleanstart" and other G.E.C. miniature machines

THE low cost, simple construction, and freedom from commutator troubles of the single-phase squirrel-cage split-phase motor are accompanied by the disadvantage that its running-up torque is less than its starting torque. In the curve reproduced, A shows the variation of torque with speed for a motor of this type. While the torque at starting is equal to that at full-load, it falls away to 40 per cent. when the rotor begins to revolve. Against a torque of 60 per cent. of full load the motor will run up only to the speed corresponding to this value.

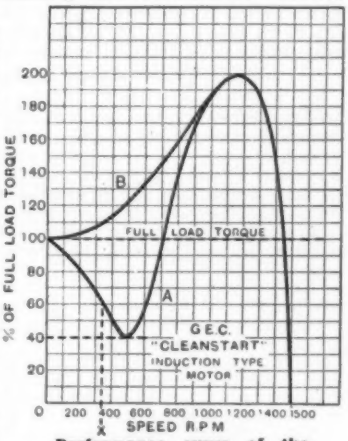
A ¼-h.p. "Cleanstart" motor

If the machine were designed to give twice full-load torque at starting, it would run up to only 80 per cent. of full-load torque, and this at the expense of heavy starting current, reduced overload capacity, lower efficiency (and more heating), a poor power factor, and a more costly starting device. High static torque is often required only to take the motor over the dip in the curve.

The performance of the same machine fitted with a "Cleanstart" rotor is indicated by curve B; the torque is maintained, so that if the machine will start it will run up to speed. The starting current is the same as with the ordinary machine (four to five times full-load), but, owing to its high acceleration, the starting current is instantaneous and a ¼-h.p. 220-V motor would not blow a 10-A fuse.

When a torque greater than full-load is required for a smaller starting current a repulsion-induction motor should be used, especially if the torque varies considerably during the cycle. A special enclosed design for refrigeration work gives complete protection to the windings, large overload capacity, and a resilient mounting, in addition to high torque and low current at starting. The superiority of the individual electric drive over the mechanical drive with high-speed gearing lies in smooth and noiseless running and lower maintenance costs.

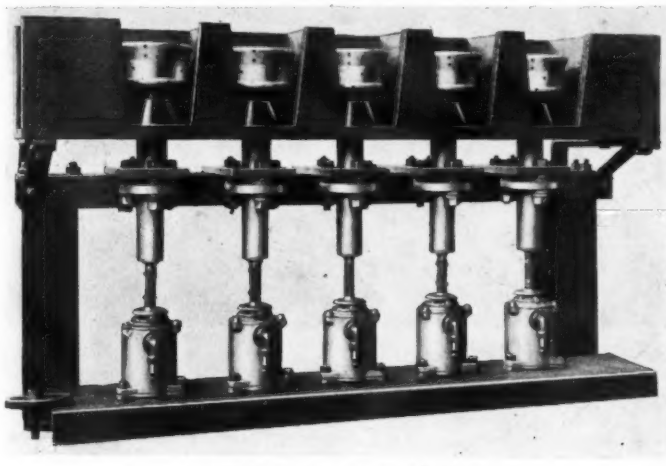
An example is the artificial-silk spinning motors illustrated; these drive standard spinning bowls at from 6,000 to 9,000 r.p.m. The G.E.C. has also designed a special vertical-spindle spinning motor for 17,000 to 18,000 r.p.m.



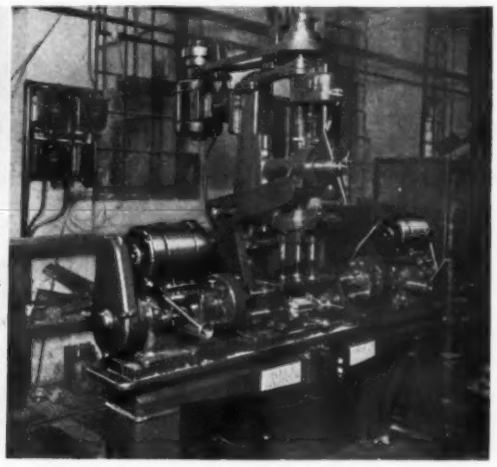
Performance curve of the "Cleanstart"

Other special applications of the fractional horse-power motor are: (1) automatic machines; (2) reproducing a mechanical movement at a distance, for which the "Twyntorq" machine has been developed; (5) machine tools, such as the multiple drilling machine illustrated, and suds pumps; (4) talking picture equipment; and (5) domestic applications, such as fans, vacuum cleaners, floor polishers, washers, gramophones, hair-dryers, vibrators, etc.

All standard types of G.E.C. fractional horse power motors for either d.c. or a.c. are mechanically interchangeable, and can be supplied with either wad-lubricated sleeve bearings or ball bearings.



Artificial silk spinning motors



A multiple drilling machine

Japan's Electrical Trade

JAPAN'S imports of telegraph and telephone apparatus as a whole decreased sharply between 1928 and 1931. In the former year their value was 3,982,000 yen; in 1930, 1,834,200 yen; and in 1931, 1,224,400 yen. The trade in radio receiving sets and parts was, however, fairly well maintained, and imports last year were 417,700 yen in value, as compared with 322,600 yen in 1930 and 594,000 yen in 1928.

A large amount of automatic telephone material has been installed in Japan, a great proportion being of American origin, and most of the remainder German. Not only has the system been in operation for some years in the large cities, but it has also been introduced in a few of the smaller towns, and at the end of 1930 there were said to be 108,100 American automatic telephone installations and 30,500 German, besides 6,000 of English origin.

The United States during the period under review made substantial progress in the trade in low-pressure electrical material, partly because of the participation of two powerful American electrical manufacturing concerns in Japanese production by the establishment of branch factories in the country. This step had a beneficial influence with the authorities in connection with contracts for material not made locally.

The greater proportion of the trade in radio receivers fell to the United States, but orders have been on a low level recently because of the prevailing depression. In ignition apparatus the trade is shared between the United States, Germany, Great Britain, and Switzerland. German batteries are said to be dear compared with American. In electro-medical apparatus, however, Germany has recovered her pre-war position.

In regard to Japanese production of low-pressure apparatus it is difficult to obtain precise details. Apparently 86 per cent. of the country's requirements of telegraphic and telephonic material are supplied by local manufacture, but at the same time it is evident that opportunities for import trade continue to arise as new inventions and improved designs are placed in the market by American and European firms. Nor is it considered likely that import trade will cease in the more complicated apparatus connected with long-distance signalling, electro-medicine, measuring, and automatic regulation.

When normal conditions return there should be a demand for the latest products of the radio industry, including both telegraphy and telephony, and for materials for television. There should also be a market for improved cinematograph apparatus.

The E.P.E.A. Dinner

WITH the E.P.E.A. dinner (more correctly the fourteenth annual dinner of the Southern Division to the National Executive Council), which was held on October 1st, the electrical "social season" may be said to have opened. This year the attendance at the Holborn Restaurant under the chairmanship of Mr. A. Harman Jones numbered 520, the largest yet recorded, and over a hundred late applicants for tickets were disappointed. Perhaps the dance, which for the past two years has succeeded the dinner, may be partly responsible for the increased size of the gathering. This year Mr. F. H. Smethurst, the hon. secretary of the Southern Division, was responsible for the arrangements, as last year.

The National Joint Board

Mr. R. S. Hudson, M.P. (Parliamentary Secretary to the Minister of Labour), proposing the toast of "The Association," referred to the unique position of electricity supply in Great Britain in having made progress while all other industries at home and abroad were in the trough of depression. During the first seven months of this year, the output of the power stations had been greater than in the whole of the preceding twelve months, and each month had shown an appreciable increase as compared with the corresponding month of last year.

His department viewed with pleasure the good work done by the National Joint Board. The Association was to be congratulated on its efforts in disseminating technical knowledge. Electrical power engineers had an enormous responsibility for electrical development, and were now able to work with much more freedom from legislative restrictions than before.

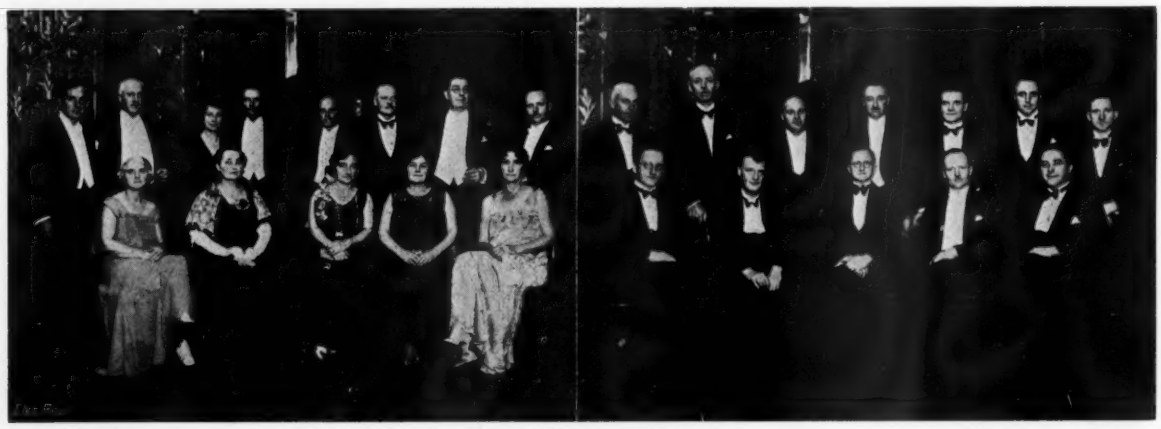
Mr. H. J. Taylor (president, E.P.E.A.), responding, emphasised that what the Association had done for its members had been reflected in the conditions of electrical engineers in general. Status alone was not enough; it must be accompanied by suitable remuneration. He referred appreciatively to the work on the N.J.B. of Ald. W. Walker, who was unable to be present, and to the honour that had been conferred upon him as Lord Mayor-elect of Manchester. The Board, during the past eighteen months, had been successful in inducing all those municipalities which had proposed to make cuts in the salaries of the technical staffs to fall in with the Government view that where automatic reductions occurred with the fall in the cost of living no further adjustments should be made. He reviewed the success of the correspondence tuition scheme, and urged manufacturing engineers to join the technical groups with a view to exchanging experiences with operating engineers.

Proposing the toast of "The Electricity Supply Industry," Miss C. Haslett (director, E.A.W.) said that while engineers had achieved a high efficiency in producing electricity, they might do more to sell it in an attractive way. Besides low prices, simple tariffs were required and an attractive form of service to the consumers. The E.A.W. was hoping to produce the "intelligent consumer."

Power in Industry

In reply, Sir John Brooke (vice-chairman, Electricity Commission) reminded those present that the progress made in building up the domestic load obscured the losses in the power load, which was the principal business of our own industry, as it was required to revive other industries. We now had in the national scheme a machine for generation such as was possessed by no other nation, and the Government relied on the technical ability and zeal of the men behind the machine, the members of the Association, to turn it to the best account.

Mr. D. J. Duffy (senior vice-president) asked Mr. A. E. Ricketts (immediate past-president) to accept a library bureau book-case from his fellow members in commemoration of his year of office. He also presented Mrs. Ricketts with a wrist watch. In returning thanks Mr. Ricketts urged those eligible for membership of the Association to become really active members.



At the E.P.E.A. Dinner

Left: Some of the guests—(Back row) Mr. A. L. Lunn, Col. Sir Thomas Purves, Miss C. Haslett, Mr. R. S. Hudson, M.P., Sir John Brooke, Mr. F. F. Rowell, Mr. T. A. G. Margary, and Mr. H. J. Taylor. (Front row) Mrs. Lunn, Mrs. Margary, Mrs. Purse, Mrs. Rowell and Lady Purves. Right: The Association's principal officers:—(Back row) Messrs. G. W. Essex, G. E. Love, J. F. Wallace, R. H. Toynbee, D. J. Duffy, F. H. Smethurst, and J. W. Thomas. (Front row) Messrs. W. A. Jones, A. E. Ricketts, A. Harman Jones, H. J. Taylor, and A. V. Sendell

Glasgow Corporation's New Showrooms

THE official opening of the new electricity showrooms and offices at 75, Waterloo Street of the Glasgow Corporation Electricity Department took place on September 30th. The new buildings occupy the site of the first power station. The Corporation early recognised the need for propaganda work and by agreement with the Electrical Contractors' Association of Scotland opened central showrooms in Sauchiehall Street in 1915. The year 1929-30 marked the commencement of a series of drastic reductions in the price of electricity. Opportunity was taken during the rebuilding of the head office building to utilise the ground floor and basement for a modern showroom on an ambitious scale.

Apart from the architectural and decorative beauty of the new showrooms the main features are the attractive lighting schemes designed for a campaign to sell more light, the large demonstration hall in the rear showroom, and the layout of the back basement for the demonstration of electricity in industry. Architectural lighting, cornice lighting, beam lighting, and lay lighting are freely employed. A room, divided into cubicles, the headquarters of a lighting assistant, is designed to display in separate compartments industrial and shop-lighting fittings with accompanying polar curves and pictures of the fittings in actual use. Co-operation between architects, contractors, consulting engineers, and the lighting assistant will be fostered and the room placed at their disposal for the demonstration of their own particular fittings to clients.

Modern ideas of domestic lighting are shown in the well furnished rooms in the basement where attractive schemes have been designed. In addition, many appliances are shown, and heating under thermostatic control is demonstrated. Vacuum cleaners and medical apparatus are displayed in separate rooms, and a room has been furnished with fireplaces to display imitation coal fires.

The layout of the back basement is for the demonstration of heavy appliances. The stage is primarily set for a laundry and washing demonstration, but it can be used for any type of lecture or demonstration, and seating is provided for fifty persons. Equipments for canteens, restaurant kitchens, washing, baking, and drying will be shown, and manufacturers will be afforded opportunities to demonstrate their equipment at special lectures. Beyond the partition wall in a fireproof room is the demonstration workshop where working exhibits will be shown of welding, carbonising, heat treatment, &c.

Massed group displays of fires, cookers and refrigerators will be arranged in the hall and seating is provided for one hundred persons.

At the opening ceremony Councillor A. Holmes (Convener of the Electricity Committee) pointed out that the Electricity Department was the largest individual ratepayer to the local exchequer, contributing in one year a sum of no less than £207,000. For the reconstruction of the building the total cost had been £60,000, whereas a new building of the same type would have cost at least £150,000.

Cordial thanks were expressed to Major Herbert Bell, M.I.E.E., the general manager, and his staff, who were congratulated on the successful inauguration of the Department's latest enterprise.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Submarine Cable Insulation

By an oversight I omitted to state in my article on this subject, which appeared in your issue of September 23rd, that the manufacture of the insulating material, "K-Gutta," was developed by, and is the exclusive property of, the Telegraph Construction and Maintenance Co., Ltd. The process by which it is produced was only briefly indicated in my article, but details may be obtained, by readers who desire further information, by consulting British patents specifications Nos. 346382, 373134, 329981, 307390, or by obtaining a copy of the *India Rubber Journal* for December 26th, 1931, which contained an article by J. N. Dean, B.Sc., on "The New K-Gutta."

I should be obliged if you would publish a note to this effect, since otherwise some misapprehension may arise concerning those responsible for carrying out the original research work.

Osterley Park, *September 29th.* Frank A. Middleton.

The palatial new showrooms at Glasgow (see opposite page): The West Hall; a display of washers; cookers, fires and small appliances; and a sitting room

Beauty and Utility

Having been guilty of taking the electricity supply to about a hundred villages, I must agree with Mr. John McConaghy that much work is not what it ought to be, with its sagging wires and unnecessarily thick poles often leaning at unsightly angles.

I would like Mr. McConaghy to see the lines erected in the villages by the Chesham Electric Light & Power Co., Ltd., and if he thinks a modern locomotive or aeroplane is a thing of beauty I am sure when he realises the almost sacred utility of electricity in the village he will agree that the æsthetic beauty of the village has been enhanced, due to the erection of overhead wires.

I would like to add that before taking the supply into the rural area it seemed an unprofitable proposition, there being no direct request for the supply, whereas after six years of working we sold last year five and a half million units in the rural area, as compared with three and a quarter million units in the town of Aylesbury, which undoubtedly shows that rural areas in general must be really anxious to have the supply; even so, it would have been financially impossible to have carried out the scheme without the use of overhead wires.

In passing, I find the reliability of overhead work very good, and with the grid supply it is probably better than the arrangements in any Continental city.

Aylesbury, *October 1st.* W. A. Turnbull, *Borough Electrical Engineer.*

I feel sure that Mr. McConaghy must have an extremely artistic temperament. Therefore, instead of drawing our attention to the so-called disfigurement of the countryside by our rural supply companies, why does he not devote his energies to suggesting an improvement?

I would propose that he commences on the petrol stations, &c.

Nottingham, *September 30th.* Arnold Hoult.

The Electrical Propulsion of Aircraft

I am sure that the article on this subject, which appeared in your issue of September 30th, has been read with more than passing interest by those who have followed the subject, since the two French officers, Capt. Renard and Capt. Krebs, first successfully built and used their electrically propelled dirigible in the years 1883 and 1885; this original machine was 164 ft. long, 27½ ft. in diameter, and was inflated by 65,600 cu. ft. of gas. The electric propulsion motor was of 9 b.h.p., driving a "tractor" type two-bladed propeller at its forward extremity, the energy being provided by a 32-cell chromium-chloride battery; the electrical plant weighed 60 lb. per h.p.

This aerial vehicle was highly successful for the period, and made seven ascents in all, succeeding on five occasions in returning to its starting point on the completion of its flight. It is astounding, in my opinion, that much more was not done towards its further development, as about this period the

light-weight internal-combustion engine was also in rapid evolution and practical development.

The well-thought-out scheme of M. Jacquot should be given every possible encouragement, as the details so clearly indicated in the excellent article all go to confirm the results of my own researches in 1910, and my original writings on the subject of thermo-electric flying machines in 1912 and 1914, in which I also pointed out the importance of the squirrel-cage induction motor for aerial propulsion.

Apart from Capt. Lucien Fialon, of Paris, M. Jacquot seems to be the only man in France who has taken the trouble to work out a reasonable scheme of development, which should be highly satisfactory, both from the technical and commercial aspects, particularly as applied to the modern powerful aeroplanes. I think, however, that the propeller speed should not exceed 500 r.p.m. for a machine speed of, say, 150 m.p.h., and I also think that the engine speed (except when first lifting and accelerating) should not exceed 1,000 r.p.m. The weights given for the complete propelling plant are rather on the low side, but I can confirm M. Jacquot's figure of 3.57 lb. per h.p. for the squirrel-cage induction motor, even on a much lower heat rating than he gives. The " Paragon " aeronautical propulsion motor with a special weldless rotor winding, which was got out for a large aerial propulsion scheme for Russia in the latter part of 1913 to operate at 100 V, at a speed of 500 r.p.m., three-phase a.c., came out under guarantee at just under 4 lb. per b.h.p. for 500 h.p. on our special aeronautical rating.

I believe that the gas engine will ultimately be generally used in all powerful aeronautical machines, as the practical defects of the oil engine will prevent its success in meeting the varying conditions of aeronautical propulsion, apart from the risk of fire. It is not generally known that the *Graf Zeppelin* used gas for propulsion when she accomplished her trip to America about two years ago. The gas engine is also the lightest and cheapest engine and there is no occasion to rate long-hour duty machines on 200 deg. C., as M. Jacquot proposes, nor do I think that so high a frequency as 200 cycles per second is necessary, even though the heat generated could perhaps easily be disposed of by means of convection due to the machine's velocity through the air. But, unfortunately, it is not when the machine is travelling at its highest speed that the greatest power is required, but when starting and accelerating. It is just here that the electric motor, as usual, is supreme, especially at a much lower frequency than that which has been proposed.

London, S.E.5, *October 3rd.* William P. Durtnall.

Evening Classes for Illuminating Engineers

It is important to those responsible for the training of illuminating engineers, particularly those who employ juniors in training, that they should be aware of the special course in illuminating engineering offered by the Northampton Polytechnic Institute. It is a matter of much regret to us to learn that when a polytechnic displays sufficient interest in this specialised branch of engineering to offer a special course, that the response is insufficient to enable its continuance.

This is the position for this session and unless a considerable increase in the number of applications is received immediately, the course will again have to be abandoned. We feel that such a course should not be allowed to lapse and that there must be sufficient people concerned with illuminating engineering in London to warrant its continuance if only the position was more widely known.

It is realised, of course, that the E.L.M.A. Lighting Service Bureau holds courses for illuminating engineers, but these are more of an applied nature and do not deal with many of the subjects necessary, such as mathematics. There is, in fact, no reason why the two courses should clash, as they are of quite a different nature.

It would appear that further advantage might be obtained if other polytechnics referred students inquiring for illuminating engineering courses to the Northampton Polytechnic which, so far as we are aware, is the only one dealing with this matter specifically, as distinct from treating the matter as a subject to be taken as part of other courses, such as the full electrical engineering course.

London, N.17, *October 3rd.* The Benjamin Electric, Ltd.
Howard Long,
Lighting Engineering Service.

Should Consumers Replace Fuses?

I would like to draw your attention to the enclosed cutting from our local paper in which a firm advertises electric lamps and offers free fuse wire with every two lamps.

I do not need to tell you the danger that unskilled people run in replacing fuses without first finding out the cause of fuses blowing. I may add that a good many of the older type of houses in St. Helens are wired, and the fuses are in very bad places, both as regards damp and inaccessibility.

I think that this matter should be brought to the notice of some authority to prevent a practice which, in my opinion, is dangerous to the public.

In support of my contention I enclose a note from the *Daily Dispatch*, headed " Electric Fuse Death," reporting the death of a man while trying to repair a fuse at his home.

St. Helens, *September 29th.* Thomas Cruise.

" I Beg to Apply . . ."

The most satisfactory method of filling vacancies would be for prospective employers to utilise the facilities offered by the Vacancy Sections of the Ministry of Labour Employment Exchanges, which exist to give the most specialised assistance in this connection.

Employers would then be spared all the time-wasting work of eliminating unsuitable applicants, and could proceed right away to examine the few qualified people introduced officially by the Vacancy Section. Applicants would have the assurance that a useful and suitably remunerative position was open and would be all the more interested in view of the Vacancy Section having submitted them as " probables."

Glasgow, *September 30th.* J. M. Dick.

Feed-water Treatment

Mr. A. B. Owles states in his article on the subject of feed-water treatment in your issue of September 23rd that silicate scales are not uncommon when the make-up water has been softened by the zeolite process.

May I point out that this is not the case when feed water has been efficiently softened by the zeolite process, and that the employment of a material which will soften rapidly and completely at high rates of flow will prevent the introduction into the hot-well of calcium and magnesium salts and will thereby prevent the formation of silicate scales.

Blackheath, S.E.3, *October 3rd.* H. C. Golder.

The Grimsby Extension

As reported in our last issue, a second 10,000-kW generating unit was officially inaugurated on September 28th at Moss Road power station, Grimsby, by Mrs. Thickett, who briefly referred to the benefits to the town due to electricity. Visual indication of the starting of the turbo-alternator was provided by a rotating circle of lamps. The Mayor (Councillor C. W. Dixon) unveiled a bronze memorial tablet giving particulars of the new plant.

At the subsequent function, Councillor Catley, proposing a vote of thanks to the contractors, said that the electricity undertaking was the first to operate a scheme of compensation for men who had become redundant through mechanical progress. Sir Felix Pole, responding, referred to the twenty years' association of the Metropolitan-Vickers Co., with Grimsby. He hoped that one day electric ploughs and threshing machines would be installed in the rural area. He suggested that the M.P. for the borough might look into the question of authorising the erection of power lines on the telephone posts. Sir Felix then handed to Mrs. Thickett a volume commemorating the occasion.

In his speech of thanks to Alderman and Mrs. Thickett and the Mayor and Mayoress, Ald. F. Barrett recalled that he was one of the first seven consumers who with sixty arc lamps provided the load when the undertaking was started in 1901. Since he became chairman of the Electricity Committee in 1920 the energy sold had increased from four million to nearly twenty-two million kWh, the number of consumers from less than 3,000 to over 13,000, the plant capacity from 5,126 kW to 25,500 kW, the connections from 8,000 kW to 28,000 kW, and the capital expenditure from £206,000 to £787,000. During this period the area of supply had grown from 44 to 325 sq. miles and the average price per kWh had been reduced from 3.6d. to 1.75d. A common note throughout the speeches was an appreciation of the services of Mr. S. R. Windle, the borough electrical engineer.

Our description of the plant last week contained two misprints. Steam pressure at the turbine stop-valve is 225 lb. per sq. in. The kWh sold in 1928 was 14,621,000 and, in 1931/1932 was 21,763,000; the increase in the four years was thus nearly 50 per cent.

Electricity Ousting Gas

At a meeting of the Lanarkshire Valuation Court at Hamilton on September 27th the County Council successfully appealed against the assessment of the gas undertaking in the county which was £69,359. The reduced figure appealed for was £56,542. Owing to the high price of gas, it was stated, many consumers had installed electricity. The price to some of the industrial concerns had been reduced from 6s. 2d. to 2s. 9d. per 1,000 cu. ft. in order to meet the competition of electricity.

New Apparatus and Devices

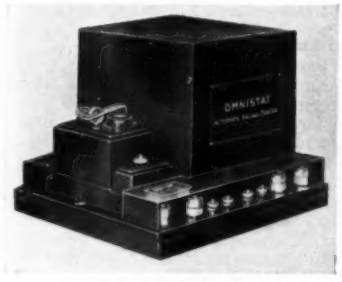
for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

Automatic Engine Control

A new system of automatic electric control for small internal-combustion engines is being introduced into Great Britain by Mr. W. A. Prescott, c/o Bank of New South Wales, 29, Threadneedle Street, E.C.

The "Omnistat" is already in use in Australia and is said to be unaffected by climatic conditions. It is designed to enable a petrol engine to be started and stopped automatically to meet predetermined requirements, to reset itself for an indefinite number of cycles of operation, and to give warning of the failure of the plant, petrol supply, cooling water, &c.

The instrument is electrically connected to a 12-V dynamotor and battery, the engine magneto, and to the external control switch, which may be placed in any convenient position. When the engine is, for example, driving a refrigerating plant, the external switch is thermostatically controlled and closes when the temperature rises above a predetermined point. This actuates a relay in the "Omnistat," switching on the ignition coil of the engine, and closes the starting circuit. The dynamotor turns the engine until it fires; when up to speed the engine drives the dynamotor, as well as the motor generator, and recharges the battery, at the same time resetting the starting switch.



The "Omnistat"

When the temperature has been reduced to the desired level the thermostat opens, and the "Omnistat" short-circuits the ignition, cuts out the battery, and reverses the position of the differential relay. Should the engine fail to start within 30 secs., a time-delay relay gives visible or audible warning. The "Omnistat" is a compact completely enclosed unit measuring 10 by 9 in. overall and 7½ in. high. All internal connections are soldered and as an additional security are held by terminal nuts.

An 11-kV Oil-immersed Isolator

A new design of pole-mounted oil-immersed isolator for outdoor use (type 10), combining a three-phase oil-immersed isolator and a compound-filled cable box, has recently been developed by Messrs. Ferguson, Pailin, Ltd.

The immersion of the switch mechanism, connections and contacts in oil results in a compact unit, self-contained with all interconnections. Erection work on site consists of little more than mounting the unit in position on the pole, which should entail a great saving in time nd expense.

The number of exposed insulators is three, against a minimum of nine in the equivalent air-break isolator and cable box arrangement, while switch contacts are less liable to be frozen up in the winter than ordinary outdoor isolators. These

The new Ferguson, Pailin oil-immersed isolator

advantages are of particular importance in situations where there are salt or impurities in the atmosphere, or where extreme weather conditions are probable.

Alignment and condition of the contacts are maintained with less attention than is required with open-type isolators, while mechanical parts are protected and the switch is self-lubricated.

The entire construction is designed throughout to withstand the effects of the most inclement weather. Access to the interior is obtained by means of a bolted-on cover which entirely encloses the switch and operating mechanism. Contacts are of the knife-blade and flexible finger pattern, the moving contacts being fitted with flicker blades for quick-break action. The switch is operated by means of a chain and dual-rod drive from ground level, the chain passing over a toothed wheel. A switch-position indicator and oil sight gauge, both visible from ground level, are provided. The switch may be locked in either the "on" or the "off" position to prevent unauthorised interference.

When the saving in time and expense in erection and general handling is taken into account, it is claimed that the cost of the oil-immersed unit is definitely competitive.

An Electric Turntable

A new electric motor turntable for moving displays in shops has recently been marketed by Messrs. Berry's Electric, Ltd., 85-86, Newman Street, W.1. The machine incorporates a "Collaro" geared motor and is designed to turn at a speed of 5 r.p.m. (Special motors can be obtained to rotate at 1, 10, 20, 30 or 40 r.p.m.) The standard turntable is 12 in. in diameter but a greatly increased display can be obtained by using an auxiliary 20-in. drum with a 6-in. skirting, costing 15s.

The motor is suitable for 100/130 V or 230/260 V a.c. at 40/60 cycles; it is rated at 30 W. The turntable will carry up to 84 lb. evenly distributed. The complete turntable and motor costs £3 16s. 6d.

The motor turntable can also be supplied for displaying electrically illuminated and/or operated apparatus. The current is then brought through the drum by means of collecting rings on the underside; a double pole connector is provided on the top and the articles displayed may be wired. Slots are cut in the skirting of the drum and plain "Celastoid" screens are fitted. These screens are illuminated from behind the drum once or twice per revolution according to their length. The price is £6.

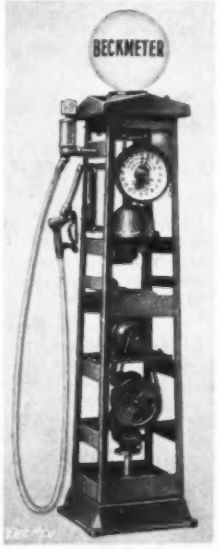
The "Berry" turntable

An Electrically Operated Petrol Pump

An entirely British made petrol pump, the "Beckmeter," has just been placed on the market by Messrs. Beck & Co., Ltd., 130, Great Suffolk Street, S.E.1.

Particular care has been taken to render every portion of the equipment flame-proof, and a special totally enclosed motor manufactured by Messrs. M. W. Woods, Ltd., has been incorporated. For the a.c. model this motor is of the repulsion-induction type with wound rotor, fitted with a short-circuiting device which, when the motor reaches a predetermined speed, comes into operation, short-circuiting the winding and having the effect of a squirrel-cage rotor. The stator is wound in the ordinary manner, but the leads are so arranged as to enable the winding to be series (200-250 V) or parallel (100-115 V). For the d.c. model the motor is series wound with standard slot type armature connected to commutator. The switch used is of the mercury tumble type.

The pump can deliver between 10 and 12 gals. per minute, and consumes approximately one kWh of electricity per 1,000 gals. The list price is £90.



The "Beckmeter" petrol pump—cover removed

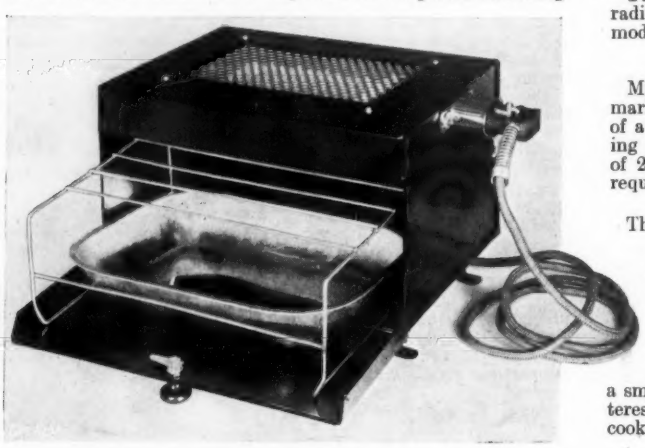
Automatic Staircase Switches

The use of short-period time switches for economical staircase lighting is on the increase. Staircase lighting, not being at the expense of the user of the lights, calls for some automatic method of switching off at the end of a period sufficient for the user to mount the stairs and reach his rooms. Switches of this kind can be used also for the short-period lighting of cellars, passages and storerooms in addition to flats, mansions and offices.

The new staircase switches being marketed by The Stonebridge Electrical Co., Ltd., Victoria Road, North Acton, W.3,

are remote controlled by means of push-buttons. The ZG model consists of a single-pole switch fitted with special alloy contacts and a clockwork regulator which is actuated by means of a solenoid operated device. The clockwork then runs down, the period of running being adjustable between the limits of one minute and three minutes. At any time during this period the switch can be set anew by means of the push-button and the actual lighting period can thus be extended. The case is of strong sheet-iron and the cover and terminal cover can be sealed if required. The maximum rupturing capacity for d.c. or a.c. up to 250 V is 660 W.

Type ZGO is for control by a separate time switch, while type HN has a built-in 3-minute or short period switching device with a 35-day reserve for the automatic lighting of staircases with permanent light in the evening and short period lighting during the night controlled from push buttons. This switch consists of a hand-wound clock with either a compensated pendulum or a precision lever escapement fitted with a switch and also with an independent short-period switching



The " Nippy " cooker

device. These units are mounted on a common base-plate of sheet-iron. The clockwork and switch as well as the short-period switching device can easily be dismantled as independent units.

The clock switches on the permanent lighting in the evening and brings the short-period switching device into action at a predetermined time during the night, and also switches it off again in the morning.

The highest rupturing capacity of the switch for d.c. or a.c. is 660 W, with a maximum current of 3 A, and the shortest interval between two consecutive switching operations (main switch) is 45 minutes.

There are also three other models differing slightly in detail.

A New Boiling Ring

MESSRS. OSWALD HOLLMANN, 19, Brackley Road, Beckenham, Kent, are supplying two new boiling plates. Both models are 6½ in. in diameter; one has a single 700-W heat and costs 13s. 3d., while the other model has a three-heat regulator switch giving wattages of 225, 450 and 900, and is sold at 21s. Both are complete with 6½ ft. of flex and a 5-A plug.

Correction

In connection with the note appearing in our last issue (page 469) headed " Electric Heaters for Tabloid Machines," Messrs. Burroughs Wellcome & Co. inform us that the word " Tabloid " is their registered trade mark and is legally restricted to their own preparations.

A New " Premier " Iron

A low-priced iron has just been placed on the market by PREMIER ELECTRIC HEATERS, LTD., Keeley Street, and St. Andrew's Road, Birmingham. The " Laundwell," as it is called, has all the refinements of previous " Premier " models and is manufactured for voltages of 100/110, 200/210, 220/230, and 240/250. It is loaded at 450 W, weighs 5½ lb., and is supplied complete with a patent detachable cord grip connector, three yards of flexible cable, and a " Bakelite " lamp adaptor.

The " Laundwell " iron

Two finishes are available — nickel plate, which sells at 13s. 9d., and chromium plate (16s. 6d.); for an extra 2s. 9d., either model may be supplied with a " Signal " connector with a lamp which lights up while the iron is switched on. All irons bear a five-year guarantee.

The introduction of new fires for the coming winter is now in full swing. One of the latest models is the " City," another appliance produced by Premier Electric Heaters. The 1-kW model has an overall size of 10½ in. high by 13½ in. wide by 5½ in. deep, and is priced at 17s. 6d. finished in antique copper. The 2-kW model, measuring 13¾ in. high by 13¼ in. wide by 6 in. deep, is sold for 27s. 6d. Both fires are fitted with the very efficient " Premier " double radius firebar and are guaranteed for three years. The 2-kW model is provided with a two-heat switch.

The " City " 1-kW fire

A Handlamp Safeguard

MESSRS. CARTER & CO. (NELSON), LTD., Nelson, Lancs, are marketing a safety coupler for portable handlamps consisting of a suitably wound transformer with an earthed screen winding between primary and secondary and a secondary voltage of 25. The price is 50s., and 25-V lamps can be provided if required.

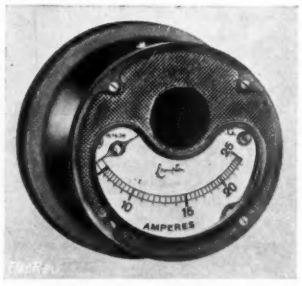
A Small Cooker

The " Nippy " cooker is a new product of MESSRS. BERKELEY & YOUNG, LTD., " David " Works, Rushey Lane, Tyseley, Birmingham.

This cooker combines many noteworthy features, not the least of which is the low price of 12s. 6d. It is a combination cooker-griller-boiler-toaster-oven and radiator loaded at 650 W. The same element is used for boiling and grilling and therefore both operations can be carried on at the same time. The appliance may also be used as a small electric fire to take the chill off the air. Two other interesting points are that it is extremely rigid and the entire cooker frame is earthed.

Small " Crompton " Instruments

The " Mumetal " is a new 3¼-in. scale iron instrument marketed by MESSRS. CROMPTON PARKINSON, LTD., Bush House, W.C.2. The price of these ammeters is one guinea; they register 0-80 A; the milliameters at the same price register up to 100 mA. Voltmeters can be obtained from 28s. according to range. (These prices are for switchboard or batten mounting types.) The appearance follows standard lines except that the scale is in the lower part of the dial instead of at the top. The movement is spring controlled and is suitable for use in any position; a zero adjuster is fitted on the top of the case.



The " Mumetal " ammeter

The instrument possesses a clearly marked case with even divisions down to one-sixth of the maximum reading. The ammeters and milliameters are claimed to have an overload capacity of one thousand per cent. momentarily, one hundred per cent. for fifteen minutes, and fifty per cent. indefinitely. Voltmeters have an overload capacity of twenty per cent. indefinitely.

The " Humifilter "

The " humifilter," a device which will circulate, filter, and properly humidify the air in a home without the use of a duct system, using electricity at about the same rate as a single incandescent lamp, has been announced by the GENERAL ELECTRIC CO., of America. It is capable of producing a complete change of air in the lower part of a house in 40 minutes. Because the human body is comparatively imperceptive to changes in the moisture content of the air, over a wide range, a way was sought to make the control of the humidity automatic, and the solution was found in a " humidistat," which measures the relative humidity of the air and automatically controls the " humifilter."

The latter has an evaporating capacity which will supply an adequate amount of moisture to homes with a volume not exceeding 50,000 cu. ft. It has a filtering capacity which will take care of a volume of about 15,000 cu. ft. It is intended to be installed on the first floor and to discharge a gentle flow of air through the floor grill. This air is taken from the basement and passed through a filter and a humidifier which makes use of hot water to facilitate evaporation. The water is heated by a small amount of steam supplied by the existing boiler. Cleaned and humidified, the air then passes through the discharge grill. The circulation is produced by a quiet, elastically mounted fan driven by a small motor. The air is brought back to the basement through a return grill at the far side of the house.

Electricity and Insolvency. By J. W. Simpson, A.I.S.A., F.S.S.

Can a supply company refuse to serve the receiver of a company ?

THE question is sometimes raised as to whether undertakers are within their rights in refusing to supply electricity to the receiver of a company without obtaining payment or a guarantee equivalent to the amount of arrears on the date of the receiver's appointment.

Under the provisions of Section 21 of the Electric Lighting Act, 1882, in the event of any local authority, company, or person neglecting to pay any charge for electricity or any other sum due to the undertakers in respect of the supply of electricity, the undertakers are entitled to cut off the supply and for that purpose may cut or disconnect any electric line or other work with which electricity may be supplied, and may, until such charge or other sum, together with any expenses incurred by the undertakers in cutting off such supply are fully paid, but no longer, discontinue the supply of electricity.

Section 18 of the Electric Lighting Act, 1909, gives power to refuse to supply electrical energy in certain cases. Among the sections of the Gas Works Clause Act incorporated with this Act is Section 39 of the Act of 1871, which provides that if any consumer of gas supplied by the undertaker leaves the premises without paying the gas rent or meter rent due from him, the undertakers shall not be entitled to require from the next tenant of such premises the payment of the arrears left unpaid by the former tenant, unless such incoming tenant has undertaken with the former tenant to pay or exonerate him from payment of such arrears. An incoming tenant who has undertaken to exonerate the outgoing tenant cannot require a supply until he has paid the arrears, but he is not personally liable for such arrears.

Mr. J. W. Simpson is secretary of the Incorporated Municipal Electrical Association

What is an Incoming Tenant?

The Official Receiver taking possession under a receiving order is not an " incoming tenant," but a trustee in bankruptcy who has taken possession *is* a next tenant. The liquidator of a company is not a " next tenant," nor is a receiver and manager of the business of a company appointed in a debenture-holders' action. It will be seen, therefore, that such a liquidator and receiver cannot require the continuance of a supply of electricity without paying the arrears due from the company.

Section 17(1) of the Electric Lighting Act, 1909, provides that twenty-four hours' notice in writing shall be given to the undertakers by a consumer before he quits any premises supplied, and that in default the consumer shall be liable to pay the money accruing due in respect of such supply up to the next usual period for ascertaining the register of the meter on such premises, or the date from which any subsequent occupier may require a supply, whichever shall first occur. The most recent case on this question was that of M'Clintock *v.* the Westminster Electric Supply Corporation, Ltd., in which it was held that the arrears due must be paid before the supply could be continued.

A Receiver's Liability

An interesting case was that of Granger *v.* The South Wales Electrical Power Distribution Co., which was an application by the receiver and manager of a colliery company for an injunction restraining the defendants from withholding a supply of electricity in accordance with a written request by the plaintiff. The colliery company was a consumer of electricity, and at the date upon which the debenture holders commenced to enforce their security by the appointment of a receiver and manager, owed the supply company, after setting off a contra account for coal supplied, something over £2,000.

The receiver and manager, requiring electricity for the maintenance of the ventilation and pumping of the mine, made an application to the power company for a supply. The company replied that it would be prepared to continue the supply to the colliery on guarantee by the receiver of payment of the arrears.

The authority of Paterson *v.* Gas Light & Coke Company (1896), appears to have been invoked by the supply company in support of its refusal. In that case the decision turned upon Section 39 of the Gas Works Clauses Act, and this section, by virtue of its inclusion in the schedule to the Electric Lighting Clauses Act, 1899, is incorporated in every special Act or Order authorising electricity undertakers to supply, except in so far as it is expressly varied or excluded by the special Act or Order.

In the present case, Section 40 of the supply company's special Act provided that " The company shall give a supply of energy to any person who requires a supply which may be given by this Act, other than supply in bulk, upon that person entering into a binding agreement to take the energy upon such terms as failing agreement shall be fixed by a single arbitrator appointed by the Board of Trade." Section 27 of the Electric Lighting Clauses Act gives a right to a supply to the owner or occupier of premises, and the provision in the Gas Works Clauses Act, which applies to gas undertakings, is similar.

Mr. Justice Bennett refused to read intothe special Act of the company the words " being the owner or occupier of the premises," and decided that as the receiver had control of the terminals to which electrical energy could be supplied, he was a person who might require a supply of electricity from the company within the meaning of Section 40 of the special Act.

Normally, of course, a person likely to be in a position to receive a supply of electricity must be either owner or occupier of premises, but apparently the peculiar position of a receiver and manager was sufficient in this instance to give point to the use of the word " person " in the special Act, so as to enlarge the provisions of the general Act of 1899.

A Suggested Aid to Business Recovery

A RECENT article in the *Electrical World* urging the wider use of trade acceptances as a possible way of stimulating buying and aiding the recovery of American business is of particular interest as it practically amounts to an advocacy of British business practice. It is impressed upon electrical utility companies, manufacturers and contractors that they can help themselves individually as well as the country at large by apprising every business client in their territory of the booklets which the American Acceptance Council publish on the use of these drafts.

The official publication of the Council defines the trade acceptance as a draft or bill of exchange drawn by the seller on the purchase of goods sold, and accepted by the purchaser with his promise to pay at a specified time and place. It proceeds to point out that in England the trade acceptance has long been regarded as " the keystone of the commercial banking system. The English merchant," the book remarks, " instead of following the American custom of bank borrowing on promissory note to pay for merchandise, gives his written obligation to the seller of the goods. This draft or bill is then discounted at the bank and automatically discharges itself at maturity."

Our object in calling attention to trade acceptances is not to take pride in the fact that British methods are being held up as examples to American business men. On the contrary, the fact that impresses us is that the American trader is apparently being urged to employ trade acceptances on a far wider scale and far more freely under some conditions than drafts, such as bills of exchange, are used in England.

Exponents of the use of trade acceptances assert that thousands of American business concerns whose banks now hesitate to extend credit on single-name paper will, through the instrumentality of the trade acceptance, find access to an important supplementary credit reservoir. If this be so, and if American trade is expected to benefit from the present campaign, is it not possible that in England the wider use of such facilities would do something towards business recovery?

Economic Conditions in Sweden

According to the *Swedish Economic Review*, the seasonal improvement in Swedish economic conditions which normally sets in during the second quarter of the year did not occur during the current year, the economic position undergoing a further, though not marked, deterioration. Foreign trade suffered a further contraction, and exports of electrical machinery declined from 13,157,000 kr. in January-July, 1931, to 8,915,000 kr. in the corresponding period of this year, exports of telephone and telegraph apparatus falling from 9,437,000 to 4,454,000 kr.

New Books

Internal-Combustion Locomotives and Motor Coaches. By the late PROF. I. FRANCO and P. LABRYN. Pp. 249. London: Sir Isaac Pitman and Sons. Price 12s. 6d. net.

This book, which is written in English, is the work of two prominent engineers of the Netherlands Railways. It is chiefly a compilation of published descriptions of Diesel locomotives and motor coaches rather than a treatise on the subject. The aim of the authors is to embody these scattered publications in a book for ready reference by railway engineers and managers. This information is supplemented by short chapters on the i.c. engine, methods of transmission, and a discussion of the advantages of Diesel motor coaches for branch lines. A comprehensive bibliography of English, French, German and Dutch publications is included.

The English on the whole is fair, but several mistakes occur in spelling, and many of the technical descriptions are not all that one could desire. We appreciate the difficulties of writing technical matter in a foreign language, but we hope that when a second edition is called for it will appear in good technical English.

Of the supplementary chapters already mentioned, that dealing with methods of transmission gives a good account of mechanical, pneumatic and hydraulic drives, but the electric drive is not given the prominence which it deserves. Moreover, the method of speed control is not explained particularly clearly, and the single schematic diagram of connections is given without any explanation. In view of the simplicity and strength of the electric drive and its exceptionally low maintenance costs compared with other methods of transmission, we should have expected the electric drive to be given first place. The maintenance of the Diesel engine itself is a formidable item in the annual costs of a Diesel locomotive or motor coach, and it is not good engineering to install a transmission system which is also expensive to maintain.

The 170 pages devoted to types of locomotives and motor coaches give 38 examples of train and shunting locomotives, and 32 examples of motor coaches. Usually the description includes illustrations, data, dimensions and fuel consumption, but in a few cases only a few lines are given. We were unable to find any mention of the Armstrong-Whitworth motor coaches. The index too is inadequate. Notwithstanding these faults the book will be useful to railway engineers and others interested in the subject.

Recent Advances in Atomic Physics. By PROFESSOR G. CASTELFRANCHI. Translated by STILES and WALSH. J. Churchill & Sons. Price 15s. net.

Modern physics textbooks are usually either advanced treatises written in a mathematical style by the foremost workers in the subject, or relatively elementary books written for the use of students who are preparing for examinations. Happily there has been a tendency in recent years to publish books intermediate between these two types. Sir A. S. Eddington's "Space, Time and Gravitation" is an example of this type of book, and the two volumes now under review constitute perhaps the most ambitious attempt of this kind that has yet been made in the region of atomic physics. Mathematical treatment is throughout of a type that a reasonably trained engineer can understand.

The difficulties of the interpretation of the experimental facts and the assumptions made in the theories are, with a few exceptions, set out and examined as an engineer would treat them. The result is a book which should be studied by engineers, and particularly by the electrical engineers of the younger generation. The first of the two volumes represents roughly the situation up to 1924, and the second volume relates mainly to what has happened since—though actually, of course, the Quantum Theory dates from Planck's work in 1900. A great deal of the book, the second volume in particular, reads almost like a novel—though scarcely one suited for arm-chair reading!—in which the efforts of the human intellect to unravel the problems of the atom constitute an entrancing plot. There is a little repetition in one or two places, due, no doubt, to the fact that this is already the third edition of a book originally published less than four years ago. The diagrams are simple and clear and the work of the translators is admirable.

"Acoustical Engineering." By W. WEST. Pp. 338; figs. 48. London: Sir Isaac Pitman & Sons. Price 15s. net.

The only thing that is misleading about Mr. West's book is the title, for the word "engineering" always implies that the subject dealt with is of a practical nature. Mr. West's book is, however, of a purely theoretical character especially suited to students and invaluable as a work of reference on technical matters.

It is difficult to keep the offshoots of an already extensive industry under one heading, but there are points frequently arising concerning matters outside his particular branch with which the electrical engineer is not familiar. Hence, if any adverse criticism is to be made at all of this admirable work it would be that no clear definitions are given. Take, for instance, the definition of "transient"; what electrical engineer could pick up this book and follow the meaning of the term? It requires an expert to understand what Mr. West has given us. The author's work is very highly thought of in America and there is no doubt that his book will go a long way to consolidate that opinion.

Shorter Notices

"Complete Wireless—Part I." Edited by E. Molloy. Pp. 56. London: George Newnes, Ltd. Price 1s.—Among the contributors to this new work, which will be completed in about twenty-four weekly parts, are such well-known radio experts as Sir Oliver Lodge, Sir J. A. Fleming, Mr. Noel Ashbridge, and Mr. J. Robinson. "Wireless Theory Made Plain" is the title of the first article in Part I, which also contains helpful notes on mains transformer construction, the modernisation of old types of sets, the simplified testing of radio components, and the care and maintenance of batteries and accumulators.

"Automobile Engineering—Part I." Edited by H. Kerr Thomas. London: Sir Isaac Pitman & Sons, Ltd. Price 1s.—This is the first of about thirty weekly parts, each containing sixty-four pages, designed to provide in a practical and up-to-date form a work of reference for those concerned with the design and construction of modern automobiles. The first volume deals concisely with thermodynamics and fuel technology.

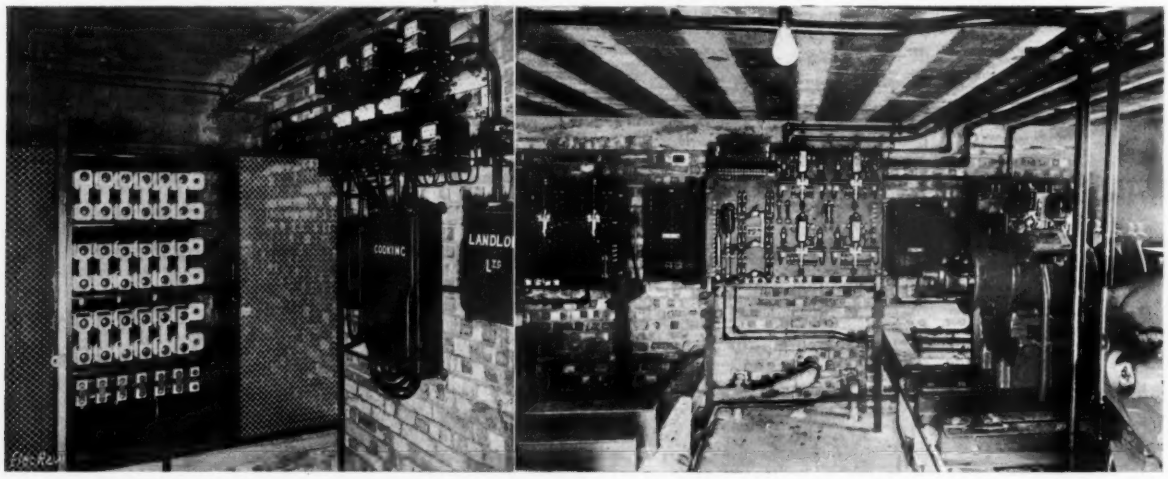
"Modern Radio Communication." By J. H. Reyner. Pp. 318; figs. 155. London: Sir Isaac Pitman and Sons. Price 5s.—This fourth edition of a book originally written to cover the City and Guilds examination has been enlarged in scope. We are glad to see that the two statements which we referred to in our review of the third edition (February 27th, 1931) have been corrected and the whole work brought more up to date.

"An Introduction to Physical Science." By Carl W. Miller, Ph.D. Pp. xii+403 figs. 187, VIII plates. London: Chapman and Hall, Ltd. Price 18s. 6d. net.

"Theory of Electricity and Magnetism." By Professor Max Planck. Translated by Professor H. L. Brose. Pp. 247. London: Macmillan & Co., Ltd. Price 10s. 6d.

"Induction Motor Practice." By R. E. Hopkins. Pp. 367; figs. 131. Price 15s. "Industrial Microscopy," by W. Garner. Pp. 389; figs. 208. Price 21s. London: Sir Isaac Pitman and Sons.

"Electricity and the Motor Car." By F. H. Hutton. 6th Edition. Pp. vi+162; figs. 133. London: "The Autocar" (Iliffe & Sons, Ltd.). Price 2s. 6d. net.



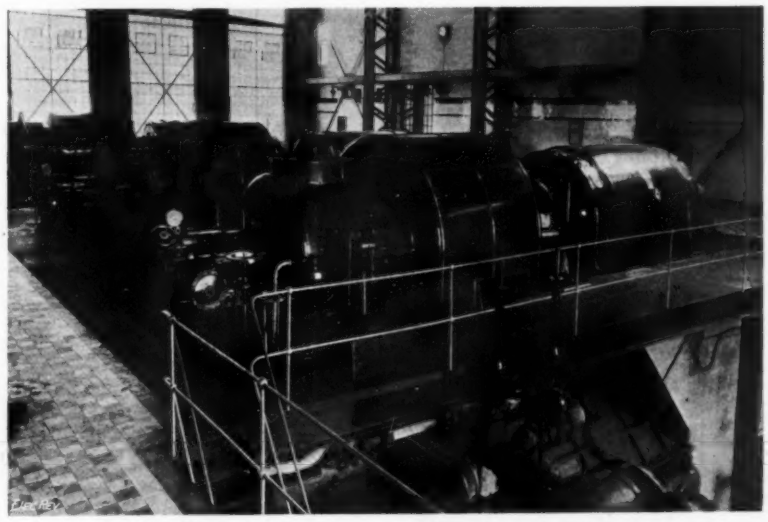
The Abercorn flats (see p. 495). Left: Switchgear for the incoming supply. Right: Lift motors and control equipment

South African Electrical Matters. (FROM OUR JOHANNESBURG CORRESPONDENT)

DURING the past few years electricity supply has made remarkable progress in South Africa. Ten years ago the number of municipalities and other local bodies generating and distributing power, whether for industrial or domestic use, was extremely small. In the interim, especially since the establishment of the Electricity Supply Commission, every public-spirited community has agitated for and got its little undertaking, and even where the number of consumers justified a station with a peak output of only 25 kW it was duly erected. The result is that there are numbers of small schemes dotted all over the country.

Unfortunately, this spirit of progress is not without its drawback. Plants absolutely incapable of development were erected in numbers of cases, with the result that a surprisingly large proportion of the municipally owned stations cannot be extended without totally uprooting the original undertakings. Indeed, so much so that undertakings costing over £60,000 only a few years back must now be scrapped altogether to make way for plants capable of showing reasonable return on the capital invested.

Moreover, the country has many d.c. schemes that from a development point of view are wholly stagnant, and the money put in them is regarded as lost. In these days it is axiomatic that where a scheme is primarily put down for the development of the domestic load, a.c. should be employed, and in every case, in this country at any rate, where conversion from d.c. to a.c. has been effected, a progressive working sheet has resulted. The number of undertakings that have changed over to a.c. in the past two years is well over forty. At the moment there are over 330 a.c. sets in the Union and 276 d.c. sets.



A Parsons 12,000-kW, three-phase turbo-alternator installed in the Congella station of the South African Electricity Supply Commission under the 1932 extension programme.

Expensive Plants

Another factor which prevented the development of electricity to its fullest possibilities was the erection of plants without due consideration of the economics involved. A steam plant was put down where the use of oil was much more economical, and oil plants were erected where coal abounded. Thus, undertakings are found near the coastal areas paying nearly £3 per ton for coal, where other fuel would have been much more cheaper. A combination of these factors resulted in undertakings whose efficiency figures must be a source of continual worry to their engineers.

However, the remodelling of generation and distribution schemes has resulted in an appreciable and, in some cases, remarkable increase in the demand. A case in point is a small town with a European population of 4,000, which for years had been struggling with a small gas plant. It was decided to scrap the gas engines and to install a steam plant with a capacity of 2,000 kW. The result was so satisfactory that within a period of two years a further 2,000 kW of plant had to be laid down and provision made for future extensions.

The Electricity Commission's Works

The Electricity Supply Commission as well has done, and is doing, its share in bringing about the electrification of the country. Although the Commission controls only four stations of any size (the Sabie station can be ruled out) its transmission wires have enabled numerous " mushroom " schemes to close down altogether in favour of bulk supply with a consequent reduction in tariffs and a far greater demand by consumers.

Some idea of the growth and extension of power supply in South Africa is brought out in the number of municipal schemes reported on by the Commission alone which, since its establishment, has totalled 216, while supplementary reports upon tenders were submitted in respect of ninety-seven others. Of the 216 no fewer than ninety-eight were new schemes and the remainder extended undertakings. Incidentally, it may be said that the Congella undertaking of the Commission (48,000 kW) is the most efficient station in the country, and uses pulverised fuel.

The larger centres, such as Johannesburg, Cape Town, Durban, Pretoria and Port Elizabeth, have participated in this electrical growth even more than the smaller towns, and the figures reflecting the rise of the domestic load in these centres are astonishing—and it continues to grow. Johannesburg is now considering the extension of its Jeppe Street station, at a cost of some £400,000 to meet urgent demands. Quite a heated controversy has been raging anent the proposal of interlinking the city undertaking with the Victoria Falls and Transvaal Power Co.'s system and obtaining the additional requirements in bulk from the latter company. In spite of the attractive tariff proposed by the private company, the City Council will proceed with the extension of its own station.

Development Methods and Future Prospects

The municipalities concerned have made these electrical developments possible by following, and in many respects adopting, the methods of the British Electrical Development Association. (Our own E.D.A. was practically still-born, but a re-birth may take place in the future.) Press advertising, posters, lectures, showrooms and exhibitions have combined to make electricity supply one of the most important industries in this country. In spite of this, it is obvious to the interested observer that only the fringe of electrical development has, as yet, been touched, but if the past two years furnish any criterion, there are boom days ahead for electricity in the Sub-continent when normal conditions prevail again.

At the present time schemes totalling several hundreds of thousands of pounds are held up pending an improvement in the money market. It is expected that the restoration of the gold standard by Britain, or, better still, its abandonment by the Union, would enable these public bodies to obtain funds to proceed with their electrical schemes. Such an event, moreover, would be to the advantage of British manufacturers, as by far the biggest proportion of the electrical plant installed in this country is of British manufacture, and the Ottawa preferences would appear to have made the British position in this field even more secure.

Rapid Expansion

The development of the electrical industry will be seen from the following figures: The amount of energy generated in the Union for all purposes between 1918 and 1923 was almost stationary around 1,200 million kWh per annum, but the figure increased steadily to 1,761 million kWh in 1925-26, and to 2,453 million kWh in 1929-30. The consumption for private lighting and domestic supply has been doubled since 1923; for tramways it has shown practically no increase since 1926; and for other purposes it has increased steadily, the most spectacular increase being with regard to railways, from nothing in 1923-24 to 176 million kWh in 1929-30. Traction supplies, however, have declined heavily during the past year, owing to the fall in railway traffic, but the domestic load is still soaring.

With regard to the average coal consumption per unit generated, the following figures may be of interest:—

Average coal consumption per kWh generated.	Number of undertakings.
Under 2 lb.	9
2 lb. and over, but under 3 lb.	10
3 lb. and over, but under 4 lb.	13
4 lb. and over, but under 6 lb.	26
6 lb. and over, but under 8 lb.	14
8 lb. and over	55

The demand for power has shown such rapid expansion in Johannesburg that it is proposed, as soon as the Provincial Administrator's sanction is forthcoming, to install at the Jeppe Street power station one 15,000-kW and one 10,000-kW turbo-alternators, one 2,000-kW house set, and three 100,000 lb. per hr. boilers, which, together with auxiliary equipment, are estimated to cost some £393,000. It is anticipated that in 1939 further extensions costing £144,000 will have to be put in hand.

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

Merger of N.E. Coast Supply Companies

As from September 30th, 1932, the Newcastle-upon-Tyne Electric Supply Co., Ltd., has absorbed the following companies, with which it has been closely associated for many years, and these companies are now dissolved:—County of Durham Electric Power Supply Co.; County of Durham Electrical Power Distribution Co., Ltd.; Cleveland & Durham County Electric Power Co.; Cleveland & Durham Electric Power, Ltd.; Northern Counties Electricity Supply Co., Ltd.; Houghton-le-Spring & District Electric Lighting Co., Ltd.; Carville Site and Power Co., Ltd.; and Tees Power Station Co., Ltd. Following upon this merger, the Newcastle Company has changed its name, and will in future be known as the "North-Eastern Electric Supply Co., Ltd." There will, however, be no alteration in the address of the registered office, which will remain at Carliol House, Newcastle-upon-Tyne. So far as consumers of electricity and contractors are concerned, the company will carry out the obligations of the other companies, and all existing agreements, contracts, &c., entered into by the other companies will remain in full force without the necessity of any assignment, the name of the North-Eastern Co. being deemed to be substituted for the names of the other companies, under the provisions of the North-Eastern Electric Supply Act, 1932.

Coil-winding Machinery Demonstration

Two new multiple coil-winding machines will be demonstrated at the Textile Machinery Exhibition which opens to-day at Granby Halls, Leicester. The exhibits are products of the Universal Winding Co., which is also showing its textile winding machines. The exhibition will remain open till October 15th.

The Reigate Showroom Proposal

Following the receipt of letters from Messrs. Tamplin & Makovski, Ltd., and the Reigate and Redhill Chamber of Commerce with reference to the provision of a showroom in connection with the electricity undertaking, the Town Council has deferred further consideration in order that the Electricity Committee may meet representatives of local electrical firms and the Chamber of Commerce to discuss the project.

An Effective Floodlighting Installation

Abbey House, the new premises of the Abbey Road Building Society in Baker Street, is one of the latest additions to London's illuminated buildings. The tower is floodlighted on all four sides with amber coloured lighting in the interior. A number of 1,000-watt "Mars" floodlights are situated on the roof opposite Abbey House for the lighting of the front face,

The tower of Abbey House, Baker Street, by night

while lamps of the same type have been placed on the side of Abbey House for the lighting of the sides and back of the tower. The equipment was supplied by the Edison Swan Electric Co., Ltd., and the work carried out by Engineering Works (Electrical and General), Ltd.

London Electric Firm's Extensions

Increased business in the manufacture of searchlights has necessitated the doubling in size of the London Electric Firm's factory at Croydon. The works are all on one floor, and the drawing and other offices are at the front of the building, with a communicating passage connecting the various manufacturing and administrative offices. The added accommodation not only provides better production facilities, but also permits the demonstration of various suspension and lowering gear, searchlights, aerodrome lights, winches, flexible couplings, current-carrying cable drums, &c.

Modern Swimming Bath Lighting

A typical example of Holophane lighting as applied to swimming baths is shown in the accompanying picture of

Holophane lighting at Thornton Heath baths

the recently opened Thornton Heath baths. A special scheme of concealed lighting was prepared, and eight lay-lights, 14 ft. square, with very light amber "raindrop" glass have been arranged in the ceiling, each having six units with 100-W lamps above. The lighting intensity and diffusion are very satisfactory, and the open-topped cubicles around the walls have adequate shadowless light. The electrical contractors were Messrs. A. E. Cook, Ltd., of Croydon.

Warrington and Electrical Contractors

Although the Warrington Corporation Electricity Committee decided in favour of a list of approved electrical contractors for the execution of work under the assisted wiring scheme, the Town Council at its last meeting objected to that recommendation. It had been proposed that in future all contractors desirous of being placed upon the Corporation's approved list must be members of either the Electrical Contractors' Association or the National Register of Electrical Contractors. This recommendation was arrived at by the Committee after a meeting with six representatives of the E.C.A., at which the qualifications for becoming approved contractors under the scheme were discussed. In a debate, it was argued that the proposal was a glaring illustration of a Corporation's power being used to secure that contractors must belong to one of two organisations. The electrical engineer to the Corporation should be the one to say whether a man was competent and qualified to do the work. Alderman Sir Peter Peacock, chairman of the Electricity Committee, pointed out that it was desirable that there should be a register of approved and reputable contractors who could be entrusted with the work. Other wiring and lighting of any description could be done by any electrician in Warrington, but all work must pass the test of the Electricity Department before electricity was supplied.

Australian Duty on Dishwashing Machines

The Commonwealth Government of Australia has postponed the deferred duties on certain goods, including electrical household dishwashing machines, until April 1st.

Electricity in Local Exhibitions

At a number of local trade exhibitions which have recently been held, electricity has been well represented by the supply authorities and local contractors.

At the annual exhibition held at Preston, the stands included those of the Carwin Electric Co., and the Ashton Electrical Co.

In addition to the stands of Messrs. G. V. Stephenson & Sons, wireless and electrical engineers, and Mr. F. Heaton, wireless retailer, at the Accrington exhibition, the Corporation Electricity Department had an excellent display of domestic appliances.

The trades exhibition just concluded at Scarborough included an attractive display of domestic electrical appliances by the Corporation Electricity Department. During the latter part of the exhibition a competition was held in which housewives cooked by electricity, gas, and coal fires. Prizes were given

in each section, and a good deal of popular interest in the rival methods of cooking was aroused.

The Dewsbury Corporation Electricity Department has an attractive display of domestic electrical appliances at the annual Trades Exhibition promoted by the Dewsbury Chamber of Trade. Continuous demonstrations have been given of electric cooking, cleaning, washing, &c., at the stand, special shows have been arranged at the Department's showrooms in the Market Place, and two lantern illustrated lectures have been given to the public in the Mayor's Parlour at the Town Hall. Messrs. Ward & Co., Ltd., and Mr. W. Angus, local electrical contractors, were also exhibitors.

Domestic electrical appliances and services figure prominently at the fourth annual Home and Industry Exhibition, held under the auspices of the Bradford Chamber of Trade, at the Olympia Hall, Bradford, which closes to-morrow (Saturday). Messrs. Brown, Muff & Co., Ltd., electrical contractors, &c., have a completely furnished bungalow as their stand, in which are displayed electric-lighting fittings, fires, an electric washer, cooker, &c. Messrs. Artnur R. Farrar & Co., electrical engineers and contractors, have a stand showing various home electrical equipment. Hoover, Ltd., exhibit jointly with Bradford Corporation Electricity Department, and the Corporation's own stand carries a general range of lighting fittings, fires, cooking, washing, cleaning and general table electrical appliances for the home. The Bradford branch of the Electrical Association for Women is represented, and is giving information on home electrical services. Radio Installations, Ltd., displays broadcast receivers of all types.

London Contractors at a Holophane Conference

On Thursday last week a large gathering of prominent London members of the Electrical Contractors' Association attended a special all-day lighting conference organised by Holophane, Ltd. The comprehensive programme, which dealt with almost every aspect of the lighting art and included reference to some of the latest illumination developments, commenced with an address of welcome by Mr. H. H. Thompson, managing director of the company. An account of the Holophane sales policy was then given by Mr. W. T. Dean, and this was followed by discourses on "Science behind Holophane Glass" (Dr. S. English) and "Holophane Developments" (Mr. E. Stroud). In the afternoon the various applications of Holophane lighting were dealt with by Mr. L. M. Tye, and a demonstration of colour lighting in the cinema was given by Mr. R. Gillespie Williams. The day's proceedings concluded with a dinner at the Criterion Restaurant.

Catalogues Required

Messrs. T. J. Edmonds & Son, electrical engineers, 5, South Parade, Melton Mowbray, are shortly opening new showrooms and ask for catalogues and lists of electrical fittings and appliances, radio apparatus, &c.

Mr. G. W. Spencer, who is opening a business as an electrical and refrigeration engineer and contractor at Napier Works, Brentwood, Essex, asks for manufacturers' catalogues, lists, &c.

Visit to Exide Works

A party of about eighty members of the Manchester, Liverpool and District section of the Institute of Transport, visited the "Exide" works at Clifton Junction, near Manchester, on September 28th. The visit was organised by Mr. David Hallowell, secretary of the Manchester and District section, in conjunction with the directors of the Chloride Electrical Storage Co., Ltd. After lunch at the Midland Hotel, Manchester, the party made a tour of the factory. The members were escorted through the various production departments by qualified guides who explained battery manufacture in detail. The visit concluded with tea at the company's guest-house which adjoins the works. Amongst those present were Mr. R. W. Royle, Mr. R. Stuart Pilcher, Mr. G. Seddon, and other prominent members of the Institute. A vote of thanks to the directors of the company was proposed by Mr. R. C. Lorimer, chairman of the section, and Mr. A. W. Browne, assistant general manager, responded on behalf of the company.

Vacuum Cleaner Competition at Brighton

In conjunction with the exhibit of the British Electric Domestic Appliances, Ltd., at the recent Brighton Electrical Exhibition a competition was organised in connection with a slogan for the "Mary Ann" vacuum cleaner for which two prizes were given each day. In the *Sussex Daily News* photograph, reproduced herewith, the Mayor of Brighton, Alderman T. J. Braybon, is to be seen presenting the prizes to the winners.

The New Alarm Bell Bylaw

In connection with the new bylaw which came into force on October 1st, whereby users are liable to a penalty of £5 if they allow an alarm bell to continue ringing for more than five minutes, King's Signs, Ltd., Sunbeam Road, Park Royal, N.W.10, inform us that they have designed a circuit-breaker especially to meet this contingency.

The Mayor of Brighton presenting "Mary Ann" slogan prizes at the Brighton Exhibition

Scottish Electrical Contractors

The Year Book and Diary for 1932-33 (price 3s. 6d. post free) of the Electrical Contractors' Association of Scotland has just come to hand. The information contained in this useful book of reference is much the same as in previous years, but the various sections have been revised and brought up to date. Following custom, the portraits of Mr. J. L. Anderson, the new president, Mr. D. Bennett, vice-president, Mr. W. Finlay, secretary, and the chairmen of the various branches are reproduced.

The Piccadilly Tube Extensions

In connection with the article in our issue of September 23rd, on the Piccadilly tube extensions, the Cambridge Instrument Co., Ltd., informs us that it supplied 23 pattern "R" wall type ammeters for the Wood Green sub-station.

Copenhagen Exhibition

In addition to those mentioned in the notes on this exhibition which appeared in our last issue, a display has been arranged by the Consolidated Pneumatic Tool Co., Ltd. This consists of a complete range of "Boyer" pneumatic riveting and chipping hammers and "Little Giant" portable pneumatic and electric drills and grinders. A 5½-in. by 5-in. vertical air compressor, made at the company's Fraserburgh Works, electrically driven, is installed for supplying the air to the pneumatic tools exhibited. The stand is in charge of the company's local agents, Messrs. Dansk Trykluft Kompagni.

Messrs. Morris & Ingram are showing a range of equipment manufactured by ten British manufacturers for whom they

Members of the Institute of Transport at the Exide Works

are export factory representatives. Included in the display are "Solon" electric soldering irons and domestic insulating tape produced by W. T. Henley's Telegraph Works Co., Ltd.

The Torquay Electrical Exhibition

An electrical exhibition, organised by the Torquay Electricity Department, will be opened on Monday next at the Town Hall, Torquay.

A £1,000 All-British House

The trend of architecture in regard to medium-sized residences is a subject of considerable interest to electrical contractors, and a visit to the exhibition now being held by the Incorporated Association of Architects and Surveyors at 1, Wilbraham Place, Sloane Street, S.W.1, is well worth while. The exhibition comprises the 371 entries received by the Association from all parts of the world in connection with a competition for the best design for a house made entirely of British materials and of which the cost, excluding the site and architect's fee, was not to exceed £1,000. The winner of the first prize of fifty guineas was Mr. E. H. Banks, the runners-up for the twenty and ten guinea awards being Messrs. Godman & Kay and Messrs. Rose & Abram respectively. The exhibition closes on October 22nd.

Cryselco Lamp Publicity

The central feature of the new season's window displays of Cryselco, Ltd., is the now familiar figure "Colonel Chris. Elco." In the largest display units he is standing on a lamp holding in his upraised hands the word "Cryselco," while his silhouette is thrown upon a background of orange. The same theme is followed in the smaller displays, but with the background omitted. With the displays the company is issuing a chart of a suggested display of "Cryselco" pelmets which is easily adaptable to any shop window from six to fourteen feet in width.

Another American Factory for England

Another American company has decided to establish a factory in England. Col. W. V. Franklin, managing director of Black & Decker, Ltd., has been instructed by his principals to make immediate arrangements for extending the local manufacture of the company's portable electric tools and fractional h.p. motors.

Hendon Charter Celebrations

Electricity was well to the fore in the celebrations at Hendon last week in connection with the presentation of the charter by the Lord Mayor of London conferring upon Hendon the status of a municipal borough. A particularly attractive car, featuring the various uses of electricity and arranged by the Hendon Electricity Supply Co., Ltd., took part in the procession, as did also a decorated lorry belonging to Standard Telephones & Cables, Ltd. The latter vehicle was equipped with apparatus representative of the company's Hendon factory, namely, a wireless transmitter, a private telephone ex-

The decorated car of the Hendon Electric Supply Co., Ltd., which took part in the Charter Celebrations

change, "Gamewell" fire alarm apparatus, and cabinet-type loud speakers. The two exhibits are shown in the illustrations reproduced herewith.

Insulating Material Companies Amalgamated

Messrs. Turner & Newall, Ltd., announce that those of its subsidiary companies which deal exclusively with the sale and application of insulating materials are to be consolidated into one organisation, which will be a branch of the parent company and will trade as "Newalls Insulation Co." The consolidated organisation will have its headquarters at Washington Station, Co. Durham. The subsidiary companies concerned are: Thomas Anderson, Ltd., Carbon Cement Co., Ltd., Hobdell, Way & Co., Ltd., Newalls Insulation Co., Ltd., Newalls Insulation Export Co., Ltd., Reid MacFarlane & Co., Ltd., Reid McFarlane & Co. (Belfast), Ltd., Reid McFarlane (London), Ltd., and Sutcliffe Bros. and Bryce, Ltd.

Recent Contracts

An order for a Yarrow water-tube boiler has recently been placed by the United Paper Mills, Ltd., of Myllykoski, Finland, with the Tammerfors Linne-och Jern Manufaktur A/B., which is the manufacturing licensee in Finland of Yarrow & Co., Ltd. Part of the manufacture of the boiler will be carried out in Finland to designs prepared by the Yarrow Co. This contract follows orders for two Yarrow boilers for the Helsingfors Municipal Electricity Works and for two further Yarrow boilers for Messrs. O/Y. Toppila, Uleaborg, some of

The Standard Telephones lorry which appeared in the Charter Day procession at Hendon

the most important orders placed for water-tube boilers in Finland in recent years.

Radiovisor Parent, Ltd., is supplying four industrial smoke indicators to the order of the North Metropolitan Electric Power Supply Co., for the new boilers at its Brimsdown power station.

Holophane, Ltd., has received contracts for the lighting of the Lindsey County Council Offices, Lincoln, and the offices and machine room at the new works of the *Lincolnshire Echo*.

Standard Telephones & Cables, Ltd., have recently received orders from the General Post Office for important extensions to the repeater stations at Leeds, Liverpool, Derby and Fenny Stratford; and for additional switchboard equipment providing 150 positions in connection with the "on demand" trunk scheme in London.

New Taunton Showrooms

The Market House at Taunton has been converted into showrooms by the Electricity Department, and was opened by the Mayor, Councillor W. E. Maynard, J.P., on September 27th.

Trade Announcements

The Charles White Electrical Co., Ltd., has moved to 234, Upper Thames Street, E.C.4. ('phone: Central 2909).

Messrs. Jones, Morris & Co., have removed to 1, Maple Avenue, Chorlton-cum-Hardy, Manchester. The telephone number will remain unchanged.

Prices of Materials

Messrs. F. Smith & Co. report, October 5th: Electrolytic copper bars, sheet and wire rods and silicium bronze wire, no change. Electrolytic copper h.c. wire, 6¾d., ⅛d. dec.

Messrs. Edward Till & Co. report, October 5th: India-rubber, Para fine, 5¼d., ¼d. inc.

Messrs. James & Shakespeare report, October 5th: Copper bars (best selected), sheet and rod, no change. English pig lead, £14 10s., 5s. dec.

New Birmingham Showrooms

The Birmingham Electric Supply Department has now another branch showroom (at King's Heath) and this was formally opened on Friday last by the Lord Mayor (Ald. J. B. Burman). Speaking at the nearby Masonic Hall, the Lord Mayor stated that two similar showrooms would follow in due course at Cotteridge and Acock's Green. Evidence that such establishments were appreciated was provided by the fact that the existing showrooms were visited last year by upwards of 50,000 people. The domestic load had more than doubled during the last few years. The area covered by the electricity undertaking was over 190 sq. miles, and there were more than 2,000 miles of cables underground and overhead. New consumers were being added at a rapid rate, the number during the past three years being 49,000, which was equal to the number connected during the first twenty-seven years' operations of the Department. The number of premises supplied to-day was about 123,000, a larger number than that served by any other provincial electricity undertaking.

A large main showroom for the display of a comprehensive selection of the latest lighting fittings, fires, cookers, water heaters, refrigerators, vacuum cleaners and other labour-saving

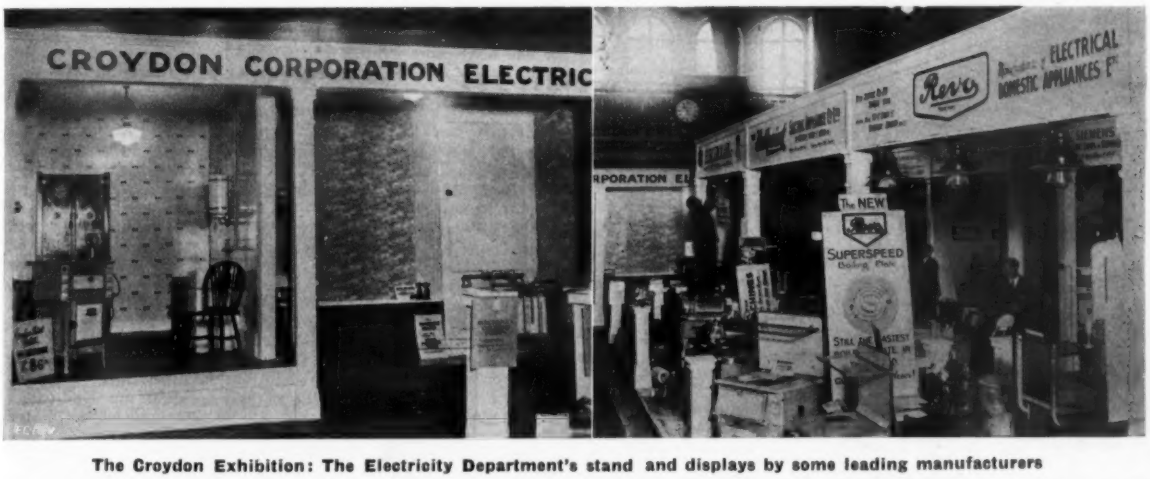
domestic appliances, is situated on the ground floor, and provision is made for administrative offices; there is also a large demonstration room.

Floodlighting at Heston and Isleworth

A feature of this week's celebrations in connection with the granting of a Charter creating Heston and Isleworth a borough, has been the floodlighting by the Edison Swan Electric Co., Ltd., in conjunction with the Heston and Isleworth Electricity Department, of seven buildings and the Pageant Grounds. The principal installation was at the Town Hall, where the problem of finding a suitable position for the projectors was overcome by fixing them to railings several feet above the ground. Seven 1,000-W rectangular "Saturn" projectors were mounted on the railings and one projector was placed on the balcony above the door for lighting the upper part of the building. Eight 500-W "Mars" projectors fitted with projector-type lamps were mounted on a lamp-post opposite the building, and two more were situated at the corners of the building. The entrance to the Baths at the opposite side of the road was floodlighted by means of two 500-W projectors which were mounted on a lamp-post opposite. Twelve 1,000-W projectors were employed to floodlight the Springrove Secondary School, while the war memorials were lighted in each case by means of four 250-W projectors. The Pageant Ground was also brightly illuminated and other effective installations were carried out.

The Croydon Electrical Exhibition

The Electric Home Exhibition, which was opened on September 28th at the large Public Hall, Croydon, by Ald. W. Peet, the Mayor, includes thirteen stands on which is a representative display of domestic appliances by well-known manufacturers, a combined display by local contractors, a miniature shop window staged by the Electric Lamp Manufacturers' Association, and a stand arranged by the Corporation Electricity Department. The Corporation stand is divided into three sections, representing a kitchen, a bathroom and a drawing room, in which electrical appliances appropriate to the surroundings are displayed. The most interesting feature of the stand is an experimental electric cooker which has been made at the Electricity Department's workshops to the design of Mr. Whitehead, the consumers' engineer, and which it is proposed to let out on hire. This model has the control unit and pilot lamp embodied in the cooker on one side, and a socket for plugging in an electric kettle on the other. In addition there are three boiling plates, which we believe is a new departure for a medium-sized cooker. The exhibitors include the following:—Electrolux, Ltd. (refrigerators, floor-polishers, &c.); Hotpoint Electric Appliance Co., Ltd. (washing machines, vacuum cleaners, fires, wash boilers, &c.); Revo Electric Co., Ltd. (cookers, fires, &c.); Belling & Co. (fires, cookers, water heaters, &c.); Credenda Conduits Co., Ltd. (cookers, fires, water heaters, &c.); General Electric Co., Ltd. (a selection of "Magnet" domestic appliances); British Vacuum Cleaner & Engineering Co., Ltd. (vacuum cleaners); Hurley Machine Co. (England), Ltd. (demonstrations of home laundry and cleaning); Bulpitt & Sons, Ltd. (patent immersion element kettles, utensils for hotplates, fires, &c.); Siemens Electric Lamps & Supplies, Ltd. ("Xcel" appliances and traffic signals); and British Thomson-Houston Co., Ltd. (a combined lamp and buzzer morse signalling equipment). The exhibition, which has been organised by Mr. W. F. Rendell Baker, the engineer and manager of the electricity undertaking, and his staff, closes on Wednesday next.



The Croydon Exhibition: The Electricity Department's stand and displays by some leading manufacturers

For Sale

Electrical plant is offered for sale by the Bermondsey Borough Council.

(See our advertisement pages to-day.)

New Catalogues and Lists

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester.—Leaflets Nos. 341/46-1 and 97/6-1, dealing respectively with new types of auxiliary relays and air-break flameproof mining switches.

Feed Water Specialists Co., Maxwell House, St. Paul's Square, Liverpool.—Two leaflets on the conditioning of boiler feed waters.

W. H. Allen, Sons & Co., Ltd., Queen's Engineering Works, Bedford.—Publications Nos. A.P. 400 and 450, relating respectively to the "Conqueror Omniductor" unchokeable pump and Allen electrical plant generally.

Newtons of Taunton, Ltd., 319, Regent Street, W.1.—An illustrated leaflet (No. G.R./1832), announcing the introduction of the new "Rotax" electric tools.

Power Plant Co., Ltd., West Drayton, Middlesex.—A folder describing the "Chevroc Minor" electrically operated high-pressure car washer. Also a calendar for October containing a supply of graph paper.

Power House Components, Ltd., Albion Chambers, King Street, Nottingham.—A leaflet on the "Wayne" self-winding cable reel.

Lancashire Dynamo & Crypto, Ltd., 94, Petty France, S.W.1.—A leaflet illustrating and describing the new "Crypto" hand dryer.

Callender's Cable & Construction Co., Ltd., 2, Surrey Street, W.C.2.—Pamphlet No. 119, dealing with vertical indoor dividing boxes for l.p. cables.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—Booklet No. S5771 (68 pages) on "Magnet Bakelite" electrical accessories. Several new developments are announced.

Bankruptcy Proceedings

F. O. Tosswill, electrical engineer, 60, Woodland Avenue, Guildford, Surrey, lately 15, Portsmouth Road, Guildford.—The receiving order was made recently on a creditor's petition, and the statement of affairs filed shows liabilities of £967, against assets of £459, leaving a deficiency of £508. The position is attributed to profits from the business being insufficient to meet heavy overhead charges and to competition by municipal trading.

R. E. Baxter, electrician and wireless dealer, 77, Hackthorn Road, Sheffield, Yorkshire.—The first meeting of creditors was held at the Official Receiver's Offices, Figtree Lane, Sheffield, on September 28th. Debtor had prepared a statement of affairs which disclosed unsecured liabilities of £106, and a deficiency of £57. The failure was attributed to heavy expenses compared with turnover, loss arising out of a partnership, and trade depression generally. The case being a summary one was left in the hands of the Official Receiver, as trustee.

E. Doudney, wholesale and retail wireless salesman, 93, East Street, Chichester.—Last day for receiving proofs for dividend October 11th. Trustee, Mr. R. W. Cave, 8, Old Steine, Brighton, Official Receiver.

H. A. Mayhew, electrical contracting engineer, 96, London Road, Apsley, Herts.—Public examination October 19th, at the Court House, St. Albans.

F. B. Jewkes (Jewkes Radio & Battery Service), radio dealer, 5, High Street, Wordsley.—Receiving order made September 24th on debtor's own petition. First meeting of creditors was held at the Official Receiver's office, 1, Priory Street, Dudley. Public examination October 12th at the Court House, Hagley Road, Stourbridge.

T. E. F. Spencer, radio dealer, 24, Nicholls Street, West Bromwich.—Receiving order made September 27th on a creditor's petition.

G. W. Mitchell, electrical engineer, 34, Locks Hill, Portslade.—First meeting to-day (Friday) at the Official Receiver's offices, 8, Old Steine, Brighton. Public examination November 16th at the Court House, Church Street, Brighton.

F. W. T. Mussett (Ferensway Electrical Co.), electrician, 31, Spring Bank, Hull.—Public examination, October 31st, at the Guildhall, Alfred Gelder Street, Hull.

E. E. Lucas, wireless and electrical engineer, 1A, Station Road, Plymouth.—Public examination October 21st, at the Western Law Courts, Guildhall, Plymouth.

T. S. Moore, electrical engineer, 29, Myrtle Street, Liverpool.—First and final dividend of 5s. 0½d. in the £, payable September 30th at the office of the Official Receiver, Government Buildings, Victoria Street, Liverpool.

Company Liquidation

H. Stanley, Ltd., dealers in radio and electrical goods, 58, High Road, Chiswick.—The report of the Official Receiver (the liquidator) has been issued and shows liabilities of £1,073, assets of £610, and a deficiency of £562 with regard to contributories. The failure of the company is attributed to insufficient capital and to losses sustained at a branch at Fulham.

Electricity Supply

Lighting, Domestic, Power

Barking.—MAINS EXTENSIONS.—The Electricity Committee is to provide mains and services to the Manor Farm Estate at a cost of £7,182. Mains extensions are also to be carried out to supply Messrs. Jaggers, Ltd., who are to electrify their new factory on the East Ham-Barking By-pass Road.

Barnstaple.—OVERHEAD LINES TO HELE MANOR.—The Town Council has applied for sanction to a loan for the erection of overhead lines to supply the Hele Manor district.

Bedford.—STREET LIGHTING.—The Town Council has decided to carry out street lighting in various thoroughfares at a cost of £1,713.

LOANS SANCTIONED.—Sanction has been received to the following loans: £5,580 for l.p. distribution to villages; £2,645 for supply to Tempsford and Old Warden; £5,000 for supply to Broom, Stanford and Wilsted; and £2,225 for reinforcement of general mains.

LIGHTING OF BLUNHAM.—The Corporation has made terms with the Blunham Parish Council for lighting the village by electricity.

Birmingham.—ELECTRICITY DEPARTMENT'S PROGRESS.—During July and August a further 1,500 consumers were connected to the Electricity Department's mains, these additions representing 16,000 lamps and 6,470 h.p. in power supplies. Since this time last year upwards of 70,000 h.p. (mainly for industrial purposes) has been added to the load. The number of premises supplied in the Department's area to-day exceeds 125,000, and despite the prevailing trade depression the sales of electrical energy continue to expand.

Bo'ness.—ELECTRICAL DEVELOPMENTS.—Good progress has been made in the laying of the new feeder cables to improve the supply conditions and provide for future developments at the electricity works. It is proposed shortly to extend the service further.

Brighton.—EXTENSION OF ASSISTED WIRING SCHEME.—The Electricity Committee proposes to extend the assisted wiring scheme to outside districts within the Corporation's area of supply, where the charges for electricity are uniform with those within the borough.

Canada.—ABITIBI POWER.—According to *The Times*, Mr. Justice Fisher has adjudged the Abitibi Power and Paper Co. bankrupt, as the result of an application made by the Canadian Packers' Company and other trade creditors.

BEAUHARNOIS PLANT IN OPERATION.—The Beauharnois power project, which was the subject of Parliamentary investigation last year in connection with the campaign fund scandal, began to function on Saturday. The principal consumers are the Montreal Power Co. and the Ontario Hydro-electric Commission. Although up to date the work has cost £10,000,000, that figure is not in excess of the estimates, and power is being delivered on the date specified in the contracts.

Continental.—BELGIUM.—Brussels was almost brought to a standstill on September 28th by the destruction by fire of the power station supplying the city. The whole station was completely burnt out except for a small sub-station. The authorities are dealing energetically with the situation and a reserve power station has been brought into operation. The damage is estimated at between 50 and 100 million francs.—*Reuter* (Brussels).

The engine room of the Brussels power station photographed after the fire which occurred there on Wednesday last week

Coulsdon and Purley.—OPPOSITION TO L.J.E.A.'s PROPOSAL.—The Urban District Council has decided to oppose the application of the London and Home Counties Joint Electricity Authority providing for the transfer to the Authority of the rights of purchase of the undertaking of the County of London Electricity Supply Co., Ltd., so far as the company operates under the provisions of the Croydon Rural Electric Lighting Order, 1905. The proposal is also to be opposed by the Mitcham Urban District Council.

Coventry.—GRID SCHEME ARRANGEMENTS.—The City Council has approved an arrangement with the Central Electricity Board under the Electricity (Supply) Act, 1926, for the sale and purchase of electricity generated chiefly at the Longford station, which is a "selected" station under the Central England Scheme. Under the arrangement, the Board will supply and the Corporation purchase the whole of the electricity it requires (including the electricity generated at the Corporation's own stations).

Darlington.—CHARGES IN HURWORTH AND CROFT.—The Transport and Electricity Committee recommends the reduction of the charge for electricity for lighting purposes in Hurworth and Croft to 6d. per kWh during the four darker months.

Eastbourne.—EXTENSIONS.—The Electricity Committee is to apply for sanction to the borrowing of £25,000 for mains and £11,760 for supply extensions to the Winkney Estate and Hampden Park.

East Cornwall.—SPECIAL ORDER.—The East Cornwall Electricity Supply Co., Ltd., is applying to the Electricity Commissioners for a Special Order authorising it to supply electricity in the boroughs of Bodmin and Lostwithiel, the urban district of Looe, the rural districts of Bodmin, Calstock and Liskeard, and parts of the rural district of Launceston.

East Grinstead.—A SUPPLY FOR WEST HOATHLY.—The Electricity Commissioners have informed the Urban District Council that they are in communication with the Weald Electricity Supply Co., Ltd., with regard to a supply to West Hoathly.

East Ham.—INSTALLATION WORK AND CONTRACTORS.—The Electricity Committee recommends that the existing practice of giving electrical installation work under the Council's rental and deferred payment schemes to local contractors in those cases where the contractor has obtained the order be discontinued, and that in future the work be executed by the Electricity Department.

EXTENSIONS.—At a recent meeting of the Electricity Committee the engineer reported that there were 52 roads or portions of roads where cables had not been laid, and submitted estimates of £22,000 for laying cables and £18,000 for services, meters, wiring schemes, &c. The Committee agreed to proceed with a scheme of extensions.

Eccles.—MAINS EXTENSIONS.—The Electricity Committee is to apply for sanction to a loan of £8,000 for mains extensions.

Falkirk.—REDUCTION IN SPECIAL CHARGES.—In regard to electricity charges it was stated at a meeting of the Corporation last week that it had not been found possible to reduce the ordinary lighting rates, but reductions had been made in special charges.

THE ELECTRICITY DEPARTMENT.—Referring to the recent refusal by the Electricity Commissioners to grant powers to the Town Council to increase its generating plant. Mr. Moffat said that the attention of the whole supply industry was focused on the Electricity Department. This was hardly surprising when they considered the very efficient state of the undertaking.

Garstang.—PROGRESS OF ELECTRICITY SCHEME.—The local Council has approved plans for the placing of cables in Myerscough, Catterall, Barnacre-with-Bonds and Garstang.

Glasgow.—MAINS EXTENSIONS.—The Electricity Committee is to lay distributing mains at an estimated cost of £1,709.

SHOWROOM SALES.—A sub-committee of the Electricity Committee is to report as to the goods and articles to be stocked in the showroom of the Electricity Department.

PROGRESS DURING AUGUST.—Under the Electricity Department's scheme 111 houses were wired in August, making a total of 36,397, while hired appliances now number 19,257.

Ilford.—NEW BULK SUPPLY TERMS.—The Town Council has obtained new terms from the County of London Electric Supply Co., Ltd., for a bulk supply for the next five years. The company is to receive an additional sum of £2,500 per annum as capital charge, £3 5s. per annum per kW of maximum demand, and 0.225d. per kWh. The former price per kW was £3 10s. per annum, and the "unit" charge 0.4d.

India.—MANDI SCHEME IN OPERATION.—According to *The Times*, the first generator in the power station at the Joginder Naggar headworks of the Mandi Hydro-Electric Works was started on Monday. Tests of 500 miles of transmission line will soon be undertaken. Recently water was let into the 2¼-mile tunnel through the Dhaola Dhar range of the Himalayas for the first time. The scheme is intended ultimately to supply power to 47 towns in Northern India, including Delhi and Simla, and the first stage, which is expected to be completed in January, is estimated to cost £4,500,000. The Dhaola Dhar range is 9,000 ft. high, and the piercing of the tunnel through it took three years.

Irish Free State.—THE SHANNON SCHEME.—Limerick Harbour Board has entered a strong protest against the rumoured intention of the Electricity Supply Board to lower the level of Lough Rea in connection with the proposed extension of the Shannon scheme. It was contended by the Board that any interference with the navigation of the Shannon would militate against the interests of Athlone, Limerick, and other places on the river.

Lowestoft.—SUPPLY TO WRENTHAM.—The Town Council has decided to give a supply of electricity to Wrentham, where houses are being erected by Messrs. Mobbs Bros., at a cost of £1,200.

Lydford (Devon).—PUBLIC LIGHTING DECISION.—The Lighting Committee has decided to light the village by electricity.

Mansfield.—CHEAPER ELECTRICITY.—The Town Council has reduced the charge for electricity for lighting on the flat rate from 5d. to 4½d. per kWh, and through prepayment meters from 5½d. to 5d.

Mickleton (Yorks).—PROSPECTS OF A SUPPLY.—A supply of electricity is shortly to be given to Mickleton.

Newcastle-upon-Tyne.—INQUIRY.—An application by Priestman Collieries, Ltd., to determine the compensation payable to them by the Central Electricity Board for damage done to their land at Whickham by the erection of overhead lines was the subject of a recent inquiry at Newcastle. For the coal company it was stated that the estimated sum payable for the land was £255; repair work damage, £279; and woodland valued at £20. The effect of the erection of the towers was to render the land useless as a building site, and it could only be used for agriculture, the difference in value being £50 per acre. For the Central Electricity Board Mr. Craig Henderson stated that they were being asked to pay what was practically full value for the land occupied by the towers; to ask the Board to pay £50 per acre merely because the lines ran through the fields was preposterous. The arbitrator will announce his award soon.

Oxford.—PROPOSAL TO REDUCE CHARGES.—The City Council is recommended to abolish the minimum payments of 9s. 4d. per quarter during the winter and 6s. 3d. in the summer, and to fix a general charge of 6d. for the first 3,750 kWh per quarter, as against 7½d. for the first 250 kWh and 6d. for the next 3,500 kWh. There will be a charge of 5d. for the next 2,000 kWh, and 3½d. beyond. For meters and time switches there is to be a quarterly charge of 5s., a reduction of 1s. 6d., and for shop window and outside advertising lighting, lighting window displays, petrol pumps, and motor garage showrooms, the charge is to be 2½d. per kWh, without time restriction, subject to a guarantee of 10s. 6d. per annum per 100-W lamp, the "unit" charge representing a reduction of 1d.

Plymouth.—NEW SUB-STATIONS.—The Electricity Committee has received sanction to the borrowing of £4,010 for new sub-stations.

MAINS EXTENSIONS.—Cable extensions in numerous roads in the city have been authorised.

Preston.—SPEEDING UP THE GRID SCHEME.—Councillor Rhodes, at a meeting of the Town Council last week, put forward a motion for the speeding up of new work schemes and said that in two years at the present rate of progress their electricity station would be overloaded. Preston was scheduled in the grid scheme for a second station, and he urged that negotiations ought to be started with the Central Electricity Board with a view to expediting that scheme.

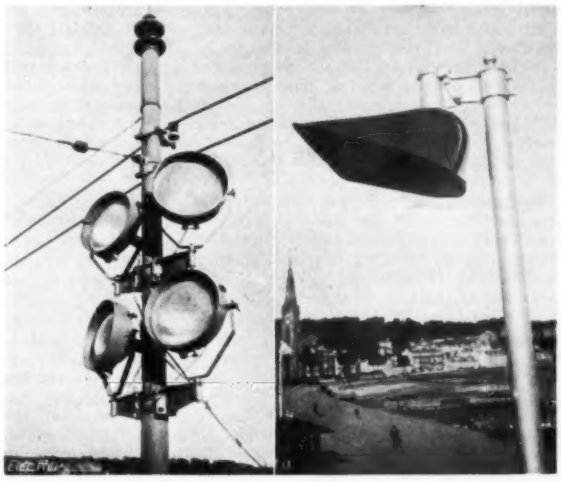
Salford.—SUB-STATIONS.—The Electricity Committee is to apply for sanction to the borrowing of £10,000 for sub-stations and equipment.

Sheffield.—STREET LIGHTING.—The Electricity Supply Committee recently offered to convert existing gas lamp fittings to electricity in certain areas in the city at the rate of 1,000 replacements per annum without cost to the Corporation. Various conditions laid down by the Watch Committee are not, however, acceptable to the Electricity Supply Committee, and so far no agreement between the two committees has been reached.

MAINS EXTENSIONS.—Mains extensions are to be carried out at a cost of £11,746.

Shipley.—ELECTRICITY CHARGED FOR WITH RENT.—The Electricity Committee has approved a scheme for collecting 1s. 6d. per week in the rent on account of the half-yearly charge for electricity supplied to tenants in Council houses.

Stalybridge.—REVISION OF CHARGES.—The Joint Electricity Board has revised its charges. For lighting there is a new sliding scale from 4½d. for the first 500 kWh to 3¾d. for 2,000 kWh or more, while the power rate is lowered from 4.5d. per kWh for 50 kWh to 0.5d. per kWh for 25,000, both charges being subject to 5 per cent. discount. For public lighting the charge will be 1¼d. per kWh, with a reduction of 1d. per kWh for all-night lighting.



Some of the equipment used for the Rothesay illuminations: A battery of four 1,000-watt floodlight projectors on a tramway pole, and a Benjamin "Duoflux" reflector for putting-green floodlighting

Stone.—EXTENSIONS.—The Urban District Council last week approved schemes for the extension of supplies at an estimated cost of £6,800. Referring to the proposed extension of the e.h.p. line from Stone to link up the bulk supply at Lightwood, the chairman of the Electricity Committee (Mr. E. T. Taylor) pointed out that there were 600 consumers in the area absolutely dependent for their supply on the overhead line from Trentham. The new line would run from Lightwood to Stone through Moddershall and Oulton, and when completed would serve as a reserve line. Tenders are to be obtained for the provision of a supply to the Hanchurch and Holly Bush Lane areas.

Swindon.—CHANGE-OVER.—A sum of £13,000 is to be spent by the Town Council in connection with the change-over of the electricity supply system from d.c. to a.c.

Torquay.—SUPPLY TO TOTNES.—The Electricity Committee is applying for sanction to a loan of £1,560, the cost of connecting the Corporation's main transmisison line to the Totnes undertaking and giving a supply thereto.

Tynemouth.—MAINS AND SERVICES.—The Electricity Committee is to apply for sanction to a loan of £10,000 for mains and services.

LOAN FOR METERS.—Sanction has been obtained to the borrowing of £7,000 for the purchase of meters.

West Bromwich.—PROPOSED TARIFF REVISION.—The Electricity Committee recommends the following alterations in the charges for electricity:—Ordinary lighting consumers on maximum demand, secondary charge to be reduced from 1d. to ¾d. per kWh. Ordinary power consumers, up to 500 kWh per quarter, 1.75d. per kWh: 500 to 2,500 kWh, 1.5d.; over 2,500 kWh, 1.25d. Bulk supply scale to commence at 100 kW with a minimum quarterly consumption of 20,000 kWh instead of 150 kW with a minimum of 25,000 kWh per quarter.

The crescent-shaped bay at Rothesay provides an ideal setting for illuminations. The whole of the installation work, both municipal and private, was carried out by the Electricity Department under the direction of Mr. W. K. Fleming, the electrical engineer

Traction

Argentina.—Diesel-Electric Trains.—Work is now nearing completion at the Scotswood Works of Sir W. G. Armstrong Whitworth & Co. on the first of four Diesel-electric power units which are being built to the order of the Buenos Aires Great Southern Railway. Each of these units is of 1,700 b.h.p., and they are stated to be the largest of their kind that have ever been constructed in Europe. One of these units is a locomotive with an overall length of nearly 72 ft., which will be used to draw freight or passenger traffic. The other three are mobile power houses, which will supply electricity to long-distance passenger trains, which include five coaches with electric motors on the axles. Each unit will have a fuel capacity of 2¾ tons of oil, and will be capable of attaining a speed of 70 m.p.h.

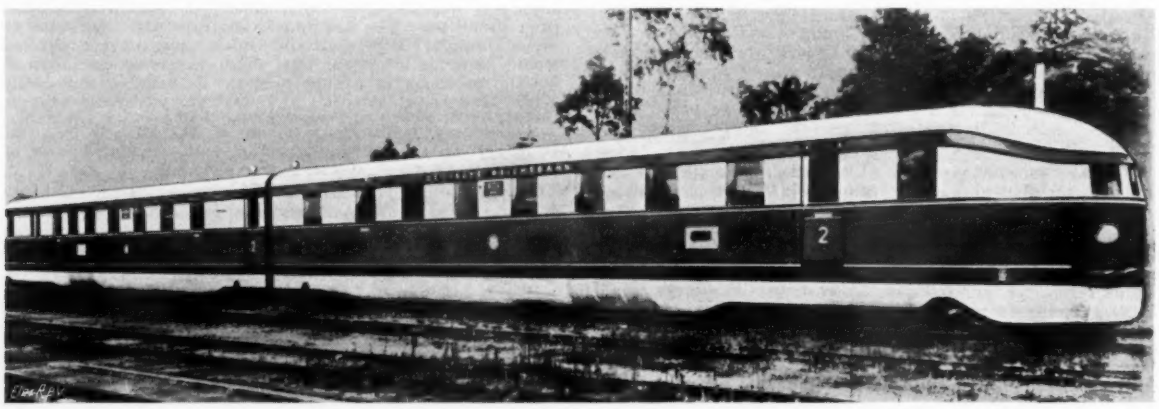
Continental.—Germany.—Successful tests have been carried out near Berlin by the Reich Railway Co. with the first German high-speed Diesel-electric train (illustrated herewith), which will be brought into use shortly between Berlin and Hamburg. It develops a speed of over 100 m.p.h., is streamlined, and is equipped with a Maybach-Diesel engine of 410 h.p., coupled direct to a Siemens-Schuckert generator.

Glasgow.—Railway Signalling Installation.—The installation of electric power signalling apparatus at the L.M.S. Railway Co.'s St. Enoch Station is almost completed. One of the features of the new system is the centralisation of control. At present five signal cabins are necessary, but in future all signals in the area will be controlled from one central cabin. There are more than fifty miles of internal wiring alone in the controls, besides many miles of cables linking up the control gear to the signals, points, and track circuits. All the material used is of British manufacture, and 90 per cent. of the work has been done by local labour. The cables have been supplied entirely by the Craigpark Electric Cable Co., Ltd., and the installation work has been carried out by the Westinghouse Brake & Saxby Signal Co., Ltd.

Leicester.—Trolley-bus Proposal.—The Tramways Committee is considering a proposal to substitute trolley-buses for trams on the Melbourne Road route.

London.—Colour Light Signals for King's Cross.—The first section of the new colour-light signalling installation at King's Cross Station (see the Electrical Review, September 16th, page 408) was put into service on Monday. The remainder of the change-over will take place in two or three weeks.

An Automatic Tube Lift.—A lift requiring no attendants and descending and ascending at fixed intervals has just been installed at Earl's Court Underground station. A Klaxon horn warns passengers when the lift is about to move.



A new stream-lined Diesel-electric train undergoing tests near Berlin last week

Communications

France.—Retention of Manual Staffs.—Soon every Paris exchange will be equipped with the automatic system and the telephone authorities have decided against dismissing the operators no longer required. A "compulsory holiday" of several days a month for each operator will serve as a temporary measure to obviate unemployment, and meanwhile Civil Service examinations are to be held in which the girls may qualify for other branches of the Post Office.—*Reuter* (Paris).

Telegraph Bill.—A Bill providing for the better protection of private wireless messages from being picked up by private stations and communicated to persons other than their addressees has been laid before the French Chamber. It seeks to increase the penalties for revealing the contents of telegrams, says *The Times*.

Radio Legislation.—A number of the municipalities in different parts of the country have bylaws under which the use of electrical appliances in such a way as to interfere with broadcast radio reception can be restricted. A recent circular asks mayors to refrain from issuing any more orders, since the subject is being inquired into by a ministerial commission with the object of standardising legislation.

Germany.—Picture Telegraphy.—A picture telegraphy service has recently been established between Germany and the Dutch East Indies.

Great Britain.—The Empire Broadcaster.—The new short-wave Empire broadcasting station of the B.B.C. will probably transmit its first programme on Christmas Day. The building has been completed, the machinery is almost ready, and test trials are likely to commence in a few weeks' time.

Radio Exchanges.—Lowestoft Town Council has granted permission to Durrant & Rayment, electrical engineers, Lowestoft, trading as Home Radio (Lowestoft), Ltd., to operate a relay service on condition that the firm does not have a monopoly. Objections to any firm having the sole monopoly were received in a petition from local radio dealers.

Brighton Corporation Works Committee has sanctioned the establishment by the Southern Relay Service, Ltd., of a broadcast relay branch at Rottingdean to serve the Rottingdean, Rottingdean Heights, Ovingdean, Saltdean and Downs Estates, subject to the company's complying with the conditions adopted by the Council governing the placing of overhead wires across public streets.

Cheltenham Corporation General Purposes Committee has received applications from the National Broadcast Relay Co., Wired Wireless, Ltd., and Mr. W. G. Denny, and recommends that none of the applications be entertained.

Submarine Telephone Cable.—Bad weather interfered again last week with the c.s. *Faraday's* work of laying the new submarine telephone cable between St. Margaret's Bay, Kent, and La Panne, Belgium.

Holland.—Marine Telephony.—A new installation now enables subscribers to the Rotterdam municipal telephone service to communicate direct by wireless telephony with tug boats and other small vessels on the canals and waterways within a radius of thirteen miles. Communication takes place in one direction only at a time.

Iraq.—New Radio Stations.—A chain of Marconi stations is to be built through Iraq, Syria, and Palestine to maintain communication along the projected British oil pipelines which are to connect the wells of the Iraq Petroleum Company at Kirkuk with the Mediterranean ports of Tripoli (Syria) and Haifa (Palestine), covering in all a distance of more than 1,200 miles. The stations will be suitable for both telegraph and telephone services, so that while normally they may operate on the Morse system it will be possible in the case of urgent messages for the engineers at the salient points to speak personally and directly with their distant colleagues.

Two of the stations are to be erected on the eastern section, at Kirkuk, near the site of the wells, and at Haditha, the site of the pipeline bifurcation. The 400-mile northern pipeline from Haditha through Syria will be served by two stations at Homs and Tripoli, and the 500-mile southern pipeline from Haditha by three stations, at Rutbah, 120 miles south-west of the junction, at Mafrak, 250 miles farther over the mountains, and at Haifa. The transmitting and receiving equipments are being built at Chelmsford; the transmitters will have a power of 500 W and will draw their electrical supplies from petrol engines, the receivers being of a special four-valve design.

South Africa.—Union-Rhodesia Telephone Service.—It is possible that a telephone service will shortly be in operation between the Union of South Africa and Southern Rhodesia. Estimates of the cost of the service are stated to have been prepared by the two Governments, and it is learned that the Beit Trust is interested in the scheme. It is anticipated that the provision of the service will be a prelude to the participation of Rhodesia in the wireless telephone system of the British Empire.

Automatic Telephony.—The work of installing automatic telephones in the Cape Peninsula is proceeding rapidly, and in the Sea Point area is practically complete. The scheme involves the replacing of some 14,000 instruments by "Neophones," and will probably be finished in May, 1933, though the actual change-over is not expected to be made before September. The type of plant being installed is the Siemens No. 51 line-finder system.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Australia.—SYDNEY.—October 24th. Department of Public Works. Auxiliary hydro-electric plant for Hume Reservoir. (A.X. 11487.)*

MELBOURNE.—November 22nd. Post and Telegraph Department. Accumulator cells and batteries. (A.X. 11491.)*

December 6th. Submarine telephone cable. (A. 11511.)*

Ayr.—October 8th. County Council. Electrical work at the Kilmaurs housing scheme. Mr. William Reid, architect, 14, Wellington Square, Ayr.

Blackburn.—October 24th. Corporation. E.h.p. metal-clad compound filled switchgear. (September 30th.)

Cheadle & Gatley.—October 14th. Electricity Department. 350-kVA transformer switch and distribution kiosk sub-station. (September 30th.)

Cleethorpes.—October 10th. Urban District Council. H.p. feeders, l.p. cables, switchgear, service boxes, prepayment meters, cut-outs, &c. (September 23rd.)

Dagenham.—October 8th. Urban District Council. Electric lighting and heating installation at salvage plant site. (September 30th.)

Dodbrooke (DEVON).—October 15th. Lighting scheme for church. Mr. A. Trant, Kingsbridge, South Devon.

Egypt.—CAIRO.—December 3rd. Ministry of the Interior. Electrical distribution network at Tanta. (A.X. 11529.)*

Farnworth.—October 10th. Electricity Department. L.p. cables. (September 30th.)

Glamorgan.—October 8th. County Mental Hospital Committee of Visitors. Wiring and fittings for lighting and power at new admission block, convalescent home, nurses' hostel and medical officer's residence at Penyfai. (September 23rd.)

Glasgow.—Estimates are invited for work, including cable and equipment, for a greyhound racing track at Possilpark. Mr. J. McSparran, 5, West Regent Street, Glasgow.

Hemsworth.—October 12th. Rural District Council. Automatic electric pumping plant for Elmsall sewage disposal works. Mr. W. T. Lynam, Market Chambers, Hemsworth.

Huddersfield.—December 1st. Royal Infirmary. Lamps and electrical sundries. General superintendent and secretary.

India.—NEW DELHI.—October 31st. India Stores Department. A.c. and d.c. house service meters. (A.X. 11517.)*

November 7th. Electric capstans for Vizagapatam Harbour. Director-General, India Stores Department, Belvedere Road, S.E.1 (deposit 10s.).

SIMLA.—November 7th. India Stores Department. Electric bulbs for signalling lamps and torches. Director-General, India Stores Department, Belvedere Road, S.E.1 (deposit 5s.).

November 14th. Inert cells and dry batteries. Director-General (deposit 5s.).

Irish Free State.—DUBLIN.—October 13th. Commissioners of Public Works. Electrical works and supplies for buildings during year commencing October 21st. Mr. J. Cassedy, secretary, Office of Public Works, Dublin (deposit £1).

London.—STEPNEY.—October 10th. Electricity Department. L.p. switchgear for Limehouse generating station. (September 23rd.)

LONDON AND HOME COUNTIES JOINT ELECTRICITY AUTHORITY. October 8th. General electrical accessories. (September 23rd.)

FULHAM.—October 29th. Electricity Department. Condensing plant, &c. (September 30th.)

Manchester.—October 7th. Electricity Department. Water-heaters. (September 30th.)

October 14th. Foundations, steelwork, &c., at Stuart Street power station. Mr. H. C. Lamb, chief engineer and manager, Electricity Department, Town Hall (deposit £1 1s.).

Oban.—October 28th. Electricity Department. Rotary or motor convertor. (See this issue.)

Plymouth.—October 17th. City Council. Automatic traffic signals. (See this issue.)

Singapore.—October 20th. Municipal Council. Electrically driven pumps. (G.X. 11874.)*

Sleaford.—October 15th. Electricity Department. House service meters. (See this issue.)

South Africa.—JOHANNESBURG.—October 20th. City Council. Automatic traffic signals. (A.X. 11510.)*

October 20th. Electric cable. (A.X. 11501.)*

November 11th. South African Iron & Steel Industrial Corporation, Ltd. Fuel-handling plant for Pretoria steelworks power station. (A.X. 11513.)*

DURBAN.—October 28th. City Council. 6,600-V metal-clad switchgear. (A.X. 11500.)*

November 4th. Pilot and telephone cable. (A. 11514.)*

CAPETOWN.—November 16th. Electricity Department. Transformers. (A. 11512.)*

November 9th. H.p., l.p. and telephone cables. (A.X. 11521.)*

GRAHAMSTOWN.—November 8th. Corporation. Transformers and other equipment (A.X. 11524)* and turbo-alternators and accessories (A.X. 11525).*

Turkey.—ISTANBUL.—October 19th. Department of Posts, Telegraphs and Telephones. 40,000 metres of cable. (A.X. 11493.)*

Uruguay.—MONTEVIDEO.—November 1st. 500,000 metres of Hackethal type insulated wire, comprising equal quantities of 16 and 20 mm. wire. (A.X. 11509.)*

Wick.—October 22nd. Town Council. Electric lighting for housing scheme. Burgh surveyor, Wick (deposit £1 1s.).

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Eastbourne.—Electricity Committee. Accepted. 500 cookers (£6,020).—General Electric Co., Ltd. Recommended. Assisted wiring installations.—Braine & Parris (17s. 6d. per point for four, five or six points and 7d. per foot run in screwed conduit).

Barking.—Electricity Committee. Recommended. Cable (£463).—A.C.E.C. Switchgear (£554).—A. Reyrolle & Co., Ltd. Rectifying equipment (£1,395).—Hewittic Electric Co., Ltd.

Health Committee. Recommended. Three hand dryers.—Lancashire Dynamo & Crypto, Ltd.

Cardiff.—Watch Committee. Accepted. Automatic traffic signals (£255).—Automatic Electric Co., Ltd.

Electricity Committee. Accepted. Vacuum and gasfilled lamps.—British Electric Transformer Co., Ltd.

East Ham.—Electricity Committee. Accepted. Transformer kiosk (£217).—Crompton Parkinson, Ltd.

Eccles.—Electricity Committee. Accepted. Reconstructing traction battery (£2,051).—Tudor Accumulator Co., Ltd.

Glasgow.—Municipal Transport Committee. Accepted. Trolley wire.—Whitecross Co., Ltd.; I.C.I. Metals, Ltd. Copper bonds.—British Insulated Cables, Ltd.

Leeds.—Tramways Committee. Accepted. Cable (£484).—Macintosh Cable Co., Ltd.

Electricity Committee. Accepted. Switchgear (£4,026).—English Electric Co., Ltd. Cables—Enfield Cable Works, Ltd. (£124); Macintosh Cable Co., Ltd. (£1,370); Edison Swan Cables, Ltd. (£709); Hackbridge Cable Co., Ltd. (£328).

London.—BATTERSEA.—Highways Committee. Recommended. Traffic signals (£91).—Forest City Electric Co., Ltd.

Manchester.—Housing Committee. Accepted. Electrical installations in Pollard Street and Chester Street dwellings.—S. H. Heywood & Co., Ltd.

Highways Committee. Accepted. Traffic signals.—Forest City Electric Co., Ltd.

Electricity Committee. Accepted. Oil switch equipment, High Street sub-station.—British Thomson-Houston Co., Ltd. Two 50,000-V testing equipments. Barton Station.—Ferranti, Ltd. Ash-handling plant, Stuart Street Station.—Underfeed Stoker Co., Ltd. Sub-contractors: W. J. Jenkins & Co., Ltd. (telpher plant); Priestman Bros., Ltd. (grab); Peter Lind & Co. (civil engineering work).

Morecambe.—Electricity Committee. Accepted. Cable for feeder from Lancaster.—W. T. Glover & Co., Ltd. Three meters.—Crompton Parkinson, Ltd.

Rawmarsh.—Urban District Council. Accepted. Installation of electricity at the isolation hospital (£171).—Messrs. Deans.

Shipley.—Electricity Committee. Recommended. Metal-clad switchgear at electricity works (£2,560).—English Electric Co., Ltd.

Southend-on-Sea.—Town Council. Accepted. 500-kVA transformers (£190).—Crompton Parkinson, Ltd.

South Shields.—Town Council. Accepted. Installation of electricity in 120 flats at Tyne Dock.—A. Eden.

Torquay.—Electricity Committee. Accepted. H.p. distribution system in Thurlestone (£1,454) and overhead main transmission line to Waddeton Court (£369).—Pirelli-General Cable Works, Ltd.

York.—Electricity Committee. Accepted. Overhead lines to Sheriff Hutton, Bulmer and Welburn (£4,097).—Johnson and Phillips, Ltd.

Forthcoming Events

Institution of Production Engineers (London Section).—Friday, October 7th. Society of Motors Manufacturers' and Traders' Building, London. 7.30 p.m. "Factory Lighting." Mr. A. E. Iliffe.

Institute of Transport.—Monday, October 10th. Institution of Electrical Engineers, London. 5.30 p.m. Presidential address. Sir David J. Owen.

Institution of Engineers and Shipbuilders in Scotland.—Tuesday, October 11th. Presidential address by Mr. A. Gilchrist. "The M. & C. System of Time Study and Rate Fixing." Mr. Sam Mavor. Friday, October 14th. Grosvenor Restaurant, Glasgow. "James Watt" dinner.

Electrical Association for Women.—Tuesday, October 11th. Showrooms of the Brompton and Kensington Electric Supply Co., Ltd., S.W. 3 p.m. Talk on "Recent Conferences in Paris and Amsterdam."

Illuminating Engineering Society.—Tuesday, October 11th. Lighting Service Bureau, W.C. 6.30 p.m. Presidential address. Lt.-Comm. Haydn T. Harrison. A report on the progress in illuminating engineering, prepared by the Technical Committee.

Diesel Engine Users' Association.—Wednesday, October 12th. Caxton Hall, Westminster, S.W. 3 p.m. "Steel Frames for Diesel Engines." Mr. C. H. Stevens.

Institution of Engineers-in-Charge.—Wednesday, October 12th. St. Bride Institute, E.C. 7.30 p.m. Presidential address, Lt.-Col. J. D. K. Restler.

British Electrical Development Association.—Friday, October 14th. Caxton Hall, S.W. 7.30 p.m. "Hotel Lighting and the Hotel Lighting Campaign." Messrs. W. J. Jones and V. W. Dale.

Birmingham Electric Club.—Friday, October 14th. Grand Hotel, Birmingham. 7 p.m. Ladies' night.

Electrical Power Engineers' Association (Manchester Section).—Saturday, October 15th. Grand Hotel, Manchester. 5.30 for 6 p.m. Annual dinner and dance.

Notes

Improved Greyhound Track Lighting

A new system of lighting was put into operation at the White City Greyhound Track on Tuesday, and, instead of three lights per span suspended from overhead wires, there is now only one, which is suspended from an inclined pole over the centre of the track. The new lighting units, which have been designed and manufactured by the General Electric Co., Ltd., have a very definite angle of cut-off, so arranged that the whole track has the lighting concentrated directly on it with no spill either on to the hare control housing or through the rails on the inside of the track, and with a complete absence of glare in the spectators eyes. There is a big saving not only in the lighting equipment, but in the cost of lighting, for, instead of three units totalling 1,100 watts per span, there will now be only one lamp consuming 1,000 watts —a saving of 10 per cent. in current consumption.

Appointments Vacant

Cable-jointer for Perth Electricity Department.
Lady demonstrator for Aylesbury Electricity Department.
(See our advertisement pages to-day.)

Street Lighting at Clacton-on-Sea

In its street-lighting improvement scheme, Clacton U.D.C. has adopted a system of centrally suspended electric lighting, including steel poles and double-span suspensions with enclosed prismatic dome reflector lanterns, spaced approximately 50 yards apart. Photometric tests show a maximum intensity of 2.5 foot-candles and a minimum intensity at the B.S.I. test point of 0.2 foot-candles on the road surface, giving a diversity of 12.5 to 1. A series of tests of average illumination show 0.71 candles per sq. ft. of road; of the 7,700 burners generated by the source, 44 per cent. are utilised on the road surface and nearly that amount on the pavements and adjacent buildings.

A special feature of the directional reflectors is that the intensity of the luminous output is rapidly reduced at angles approaching the horizontal plane. Visual inspection showed an absence of glare due to the reduction in intensity of succeeding units as they become more remote. The installation is supplied from underground mains *via* time switches and fusegear housed in the base of the poles.

Mr. Geo. Broadhurst, electrical engineer and manager, Clacton U.D.C., was responsible for the scheme. The equipment was designed and supplied by the Revo Electric Co., Ltd.

The Illuminating Engineering Society

At the opening meeting of the Illuminating Engineering Society, which will be held at the London Lighting Service Bureau on October 11th, at 6.30 p.m., Lt.-Commander Haydn T. Harrison, M.I.E.E., will deliver his presidential address. The remainder of the evening will be devoted mainly to the demonstration of exhibits illustrating progress in illumination. Members who have anything to show are asked to communicate at once with the hon. secretary (Mr. J. S. Dow, 32, Victoria Street, S.W.1). The hon. secretary also desires to hear as soon as possible from any members or their friends who wish to take part in the visit to the Shakespeare Memorial Theatre, Stratford-upon-Avon, on October 18th.

Supervising Electrical Engineers

The inaugural meeting of the 1932-33 session of the Association of Supervising Electrical Engineers will be held on October 18th at the Junior Institution of Engineers, 39, Victoria Street, S.W., at 7.15 p.m., when Mr. G. Scott Ram will deliver his presidential address.

A Conference of Women Demonstrators

The first conference of women demonstrators holding the E.A.W. Grade I Diploma was held at the Birmingham Electric Supply Department's showroom, Paradise Street, on Saturday last, when the delegates were welcomed by Mr. W. Y. Anderson, commercial engineer to the Department.

Miss Haslett, Director of the E.A.W., pointed out that now that the work of the woman demonstrator was being recognised as of great value, her status and remuneration should be improved, and she should also be better trained and have more time to get in touch with women's organisations. Mrs. I. Williams, of the Birmingham Electric Supply Department, suggested that one type of woman demonstrator should act as publicity agent by lecturing and establishing contact with housewives, while another type should confine her work solely to demonstration.

Miss E. D. Lockley, of the S.W.S. Power Company, spoke of the work in rural areas, and dealt with exhibitions in village halls and talks to Women's Institutes, and referred to the interest taken in the S.W.S. demonstration caravan, in which twelve people could be seated for a cookery demonstration. The view of the manufacturer's demonstrator was given by Mrs. Flack, of the G.E.C., who pointed out that much of her work was concerned with testing and experimenting to see that various improvements carried out by the firm were of real practical use.

The E.D.A. area officer, Lt.-Cdr. E. A. Neal, stressed the tremendous amount of development work done by women demonstrators and agreed that contact with other women's organisations was most important.

The Scottish Ideal Home Exhibition

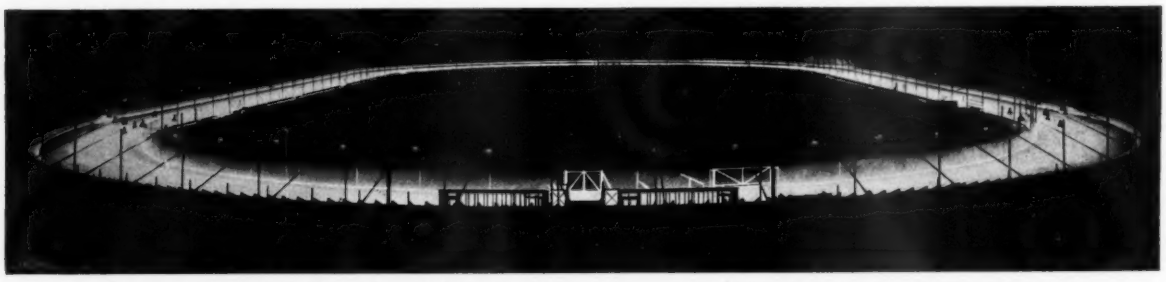
The electrical industry is well represented this year at the Scottish Ideal Home Exhibition organised by the *Daily Mail*, which was opened in the Kelvin Hall, Glasgow, on October 5th, by Lord Provost Sir Thomas Kelly, Glasgow, and will remain open until the 29th. There is a large number of electrical exhibitors, and the organisers have made generous use of electricity. In "The House that Jean Built," a house which has been specially designed and built for this show, electricity is being used wherever possible, while in a series of ideal kitchens which have been designed for the organisers by Mrs. Darcy Braddell, a full range of electrical devices is being shown. For the first time at an exhibition of this kind in Scotland the electric sign trade is exhibiting. No fewer than 20,000 electric lamps are to be used to illuminate the hall. Electricity has been used to form a centrepiece for the exhibition. The layout of the hall has been so designed that there is a central avenue, and right in the heart of this "The Garden of Light." The designers and builders were Venreco, Ltd.

The Shoe and Leather Fair

The Shoe and Leather Fair at the Agricultural Hall, Islington, closes to-day (Friday). In the machinery section direct motor drive is unusual; the V-belt drive is being introduced in many machines, notably by the British United Shoe Machinery Co.

The New Fortuna Machine Co. show a new skiving machine which can be electrically driven. A new sole sewer, exhibited by V. Spicer & Co., has a revolving thread holder or horn. The "Ley" stitcher cuts a channel and stitches in one operation; it is electrically heated and has three heats. Planets, Ltd., show a new "Frobana" sole sewer with a heating element in the horn. There are several machines for attaching stick-on soles to dainty shoes. S. K. Hodgkins show Michalk's new machine, electrically driven and heated. A. T. Ralph, Ltd., exhibit two new machines for this purpose. In one the shoes are on a travelling belt, and when the solution and soles are applied the shoes travel through a tunnel through which electrically heated air is driven by an electric fan; in the other, the shoes revolve on a wheel and are themselves heated to dry off the solution. The Standard Engineering Co. also shows a stick-on sole machine which is electrically heated. Ralph's sole-roughing machine is driven by a motor built into the pedestal of the machine.

The Singer Sewing Machine Co. demonstrates a new compact drive for running from eight to ten machines. The motor is placed under the bench and the machines driven from it by V-belt drives. The Standard Engineering Co. shows an embossing machine for stamping makers' names on leather or silk, which is electrically heated. Messrs. Wilson, Edward and Son introduce a new non-chokable pump for draining tanning pits. The International Time Recording Co. exhibits a new electrically driven self-regulating time recording clock, controlled by a pendulum type master clock.—VIOLA RIPLEY, B.Sc.



The new system of G.E.C. lighting which was put into operation at the White City Greyhound Track this week

Our Service Department

Enquiries must be accompanied by a stamped addressed envelope.

We shall be glad to learn the name and address of the makers of the following:—

H.F. plastine suflux.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

Mr. C. Parker, general manager and secretary of the Westminster Electric Supply Corporation, Ltd., has been appointed to the board of the Corporation.

Mr. P. T. Wood, of the Northampton Electric Supply Co., Ltd., has been appointed by Bedford Corporation Electricity Committee as assistant mains engineer.

Mr. E. J. Parnall, whose article on "Prepayment Consumers" appears on p. 495 of this issue, was educated at the Isle of Wight College and Portsmouth Grammar School, and was a pupil electrical engineer with Messrs. Wm. Geipel & Co., in 1914. He joined the Tyne Electrical Engineers, R.E. (T.A.), in 1916 and was commissioned in 1917, and subsequently went to France. He is still a lieutenant in the "Tyne Electricals." He graduated at Bristol University in 1920 as B.Sc. (Electrical Engineering), with honours, and in 1923 was appointed an assistant engineer in the Lighting and Heating Department of the Newcastle-upon-Tyne Electric Supply Co., Ltd. In 1924 he was placed in charge of the company's Whitley Bay and Monkseaton branch office and showroom, and in 1926 was transferred to the head office as personal assistant to the chief engineer of the Lighting and Heating Department, which position he still holds.

[Russell & Sons.
Mr. E. J. Parnall, A.M.I.E.E.

Mr. C. A. Bishop has relinquished the position of general manager of Davy Bros., Ltd., Sheffield, to become the company's London representative.

Councillor Frederick H. Morecroft, who is in business in Dover as an electrician, is to be the next Mayor of the town. He has been a member of the Town Council for ten years.

Mr. Archibald McKinstry has been appointed managing director of Messrs. Babcock & Wilcox, Ltd., and **Lt.-Col. J. H. M. Greenly** has been elected deputy chairman. Mr. McKinstry commenced his electrical career in 1902 as junior engineer with the British Westinghouse Co. and later was connected with Metropolitan-Vickers, becoming chairman of the Metropolitan-Vickers Electrical Export Co., Ltd., and a director of the Metropolitan-Vickers Electrical Co., Ltd. He severed his connection with the Metropolitan-Vickers Co., Associated Electrical Industries, Ltd., and connected companies in December, 1930. In 1911 he went to Australia and New Zealand, and in 1918 was appointed an Electricity Commissioner to the State of Victoria. He visited the United States and Canada in 1920 and 1921 on electrical matters, and from 1922 to 1927 he was a director of the British Broadcasting Co. He has also served on the Council of the B.E.A.M.A., retiring in 1930. He was appointed a director of Messrs. Babcock & Wilcox, Ltd., early in 1931. Mr. McKinstry is a member of the Institution of Electrical Engineers, and a paper by him on "Notes on Electrical Calculations of High Voltage Transmission Lines" appeared in the I.E.E. *Journal* in 1920.

[International Rotogravure.
Mr. A. McKinstry (managing director) and Lt.-Col. J. H. M. Greenly (deputy chairman) of Babcock & Wilcox, Ltd.

Lt.-Col. Greenly was trained as a civil engineer. He had a distinguished career during the war, and was twice mentioned in despatches, being awarded the C.B.E. in 1919. In addition to his appointment with Messrs. Babcock & Wilcox, he is on the board of the Indian Copper Corporation, Ltd., H. H. Vivian & Co., Ltd., and the Linley Engineering Co., Ltd.

Miss Hainsworth, lady demonstrator at the Aylesbury Corporation electricity showrooms, is leaving on October 14th to take up a similar position with the Bradford Corporation Electricity Department. In the accompanying illustration she is seen feeding ducks which were electrically incubated and reared in the electrical showroom.

Miss Hainsworth with some electrically reared Aylesbury ducks

Mr. A. Lennox Stanton, who has been elected president of the Overhead Lines Association, has had a wide experience in the field of public utilities, embracing British, American and Colonial practice. During the last eleven years in particular he has conducted numerous inquiries and investigations in connection with the financial and engineering aspects of public supply schemes, hydro-electric *versus* steam developments, railway electrification, and large scale industrial projects. He investigated and reported upon British tramway undertakings in 1925, having special reference to facilities presented by the adoption of the trackless trolley system. In India he was engaged in drawing up public works engineering contract specifications, inspection duties and reports. During 1923 and 1924 he acted as "collaborator" with the Boiler Code Committee of the American Society of Mechanical Engineers in relation to the new Indian Boiler Regulations of 1924, and also with the Test Code Committee of that Society in connection with the A.S.M.E. power test code for hydraulic equipments. He has read a number of papers before engineering and scientific institutes. Mr. Stanton is a member of the Institutions of Electrical and Mechanical Engineers, of the American Institute of Electrical Engineers, and of the Institute of Engineers (India).

Mr. J. H. Jones, the assistant manager at the Leeds branch of the General Electric Co., Ltd., has been appointed manager of the branch in succession to the late Mr. T. Smith. Mr. Jones joined the G.E.C. in 1910, and, after serving in the works and switchgear drawing office, was in charge of "A" Department, at the Glasgow branch, for a short period. He returned to Witton in 1915, and acted as chief of the Switchgear Testing Department, and assistant to Mr. Coles, the chief draughtsman. In 1920 he went to the Birmingham office as outside sales engineer for colliery equipment, and also travelled the Welsh territory north of Shrewsbury, handling the sale of material for all departments. Prior to joining the G.E.C., Mr. Jones had five years' drawing office experience with Messrs. J. H. Tucker & Co., Ltd., Midland Electric Manufacturing Co., Ltd., Simplex Conduits, Ltd., and the British Thomson-Houston Co., Ltd. He is well known in electrical circles, especially in the North and the Midlands.

[Bacon, Leeds.
Mr. J. H. Jones

Mr. G. W. Spenser is opening a business as an electrical and refrigeration engineer and contractor at Napier Works, Brentwood, Essex. Mr. Spenser, who was formerly manager of

Messrs. Playle, of Maldon, has also held positions with the Isle of Wight Electric Light & Power Co., Ltd., and with the Chloride Electrical Storage Co., Ltd., being attached to the latter company's technical staff in Bombay.

Mr. George V. Twiss has retired from his position of managing director of British Power & Light Corporation (1929), Ltd., and will concern himself with further activities in electricity supply. His new offices are at 32, Victoria Street, S.W.1; telephone: Victoria 7600-1. Messrs. G. V. Twiss & Partners, consulting engineers, have removed their offices from Artillery House to 32, Victoria Street, S.W.1.

Various reports have been appearing in the Press with reference to the Insull companies and the presence of **Mr. Samuel Insull** in Paris. The U.S. District Attorney at Chicago cabled to Mr. Insull, and to his brother, **Mr. Martin Insull**, in Canada, asking them to go to the States to explain certain matters which had arisen in connection with the investigations of the affairs of the Insull companies. Later reports state that **Mr. Samuel Insull, Junior,** arrived at Liverpool on Monday in the *Britannic* on his way to join his father in Paris. He said he was deputy-chairman of the Chicago Electric Company and he had not had a holiday since 1929. He expects to return to America in November. He stated that he had no knowledge of the reported purchase of a residence and estate at Theale, near Reading, by his father, and he declined to discuss the affairs of the Insull companies.

According to Chicago dispatches published in the London newspapers on Wednesday, Messrs. Samuel and Martin Insull were indicted at Chicago on Tuesday on "serious fraud charges." Warrants for their arrest were issued and the State Attorney announced that extradition steps would be taken unless the brothers appeared voluntarily to defend themselves.

Mr. H. J. Groves-Webb, A.M.I.E.E., has resigned his position as London branch engineer and manager for Messrs. Johnson and Phillips, Ltd., with whom he has been for the last thirteen years. Letters should be addressed to him at 17, Webster Gardens, W.5, or at the Royal Automobile Club, Pall Mall, S.W.1.

Mr. A. S. Markwick has been appointed to represent Messrs. J. H. Tucker & Co., Ltd., in the East Midlands division, namely, the counties of Lincoln, Rutland, Leicester, Nottingham, and Derby. He has had a long and comprehensive experience in the electrical accessories trade with such well-known organisations as Messrs. W. J. Furse & Co., Ltd., Nottingham; Verity's, Ltd. (at their Glasgow office), and the Edison Swan Electric Co., Ltd. (Leicester office). His address is "Blythwood," Park Road, Birstall, Leicestershire.

Major John Cameron, who retired on September 30th from the position of assistant superintendent engineer in the General Post Office, Glasgow, after forty-six years' service, was entertained by his former colleagues on Friday last and received gifts from the engineering and telegraph branches.

Miss Katharine Page, the daughter of Sir Archibald Page, is giving a recital in song and elocution this evening (Friday) in the Small Public Hall, Croydon.

Lt.-Commander the Hon. J. M. Kenworthy has been appointed a director of Ruths International Accumulators, Ltd.

Mr. John C. Chesman, of the electrical staff of Rotherham Corporation, was married on September 10th to Miss Gertrude H. Wood, of Thorpe Hesley.

Obituary

Herr L. Hagen.—The death is reported of Herr Louis Hagen, which occurred at Cologne on October 1st at the age of 77. He was a member of the boards of several German industrial concerns, including the A.E.G.

Will.—Mr. J. H. Davey, of West Norwood, retired superintendent of the Eastern Telegraph Co., left £11,456 (net personalty £11,404).

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

Berry & Wilson, Ltd.—Private company. Registered September 27th. Capital, £500 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in wireless apparatus, electrical fittings and appliances, etc. The directors are: B. S. Berry, 2, Ashgrove, Lidget Hill, Bradford, and J. Wilson, 4, Springhead Road, Thornton, Bradford. Solicitors: Gaunt, Foster & Co., 1, Cheapside, Bradford.

J. Cameron & Co. (Leeds), Ltd.—Private company. Registered September 28th. Capital, £1,000 in £1 shares. Objects: To acquire the business of an electrical engineer and contractor, carried on by Alice Cameron at 11a, North Place, Leeds. The subscribers are: H. W. Langley, 90, Queen's Road, Hyde Park, Leeds, and Mrs. Alice Cameron, 147, Spencer Place, Roundhay Road. Registered office: 11a, North Place, Leeds.

Bellphonic Radio & Lighting Co., Ltd.—Private company. Registered September 29th. Capital, £100 in £1 shares. Objects: To carry on the business of wholesale and retail radio manufacturers and merchants, electricians, workers of and dealers in electricity, etc. The subscribers are: G. Boggis, 7, Hornsey Lane Gardens, Highgate, N.6, and Jessie M. Thorpe, 7, Wood Side, Erskine Hill, N.W.11. Solicitors: Landman and Foy, 22/3, Laurence Pountney Lane, E.C.4.

Elector, Ltd.—Private company. Registered September 30th. Capital £100 in £1 shares. Objects: To carry on the business of dealers in radio sets and component parts, &c. The directors are: G. O. Horsford, 79, Onslow Gardens, S.W.7; and H. Cohn, 75, Castellain Mansions, Maida Vale, W.9. Solicitors: Lieberman, Leigh & Co., Granville Chambers, Bury Street, W.C.1.

Wates Radio, Ltd.—Private company. Registered September 30th. Capital, £5,000 in £1 shares (2,000 preference and 3,000 ordinary). Objects: To carry on the business of manufacturers of and dealers in goods in connection with radio-telegraphy, telephony and television, and mechanical, electrical, and civil engineers; and to acquire the business carried on by the Standard Battery Company. The subscribers are: A. Kinge, 58, Montana Road, S.W.17; and A. T. Winfield, 131, Grant Road, S.W.11. Registered office: 184, Shaftesbury Avenue, W.1.

Fred Dawson & Co., Ltd.—Private company. Registered September 30th. Capital £5,000 in £1 shares. Objects: To acquire the business carried on by Fred Dawson at 9, Mill Hill, Leeds, and to carry on the business of electrical and radio distributors and dealers, &c. The directors are: F. Dawson, 23, West Park Drive, Shadwell, Leeds; and H. Hicks, 25, Salisbury Avenue, Armley, Leeds.

Dennis & Whitehead, Ltd.—Private company. Registered October 3rd. Capital, £500 in £1 shares. Objects: To carry on the business of manufacturers and repairers of, agents for and dealers in wireless sets, components and apparatus, electrical fittings, &c. The directors are: C. E. S. Dennis, 20, Elmhurst Drive, South Woodford, and B. R. Whitehead, 9, St. Mary's Lane, Cranham, Essex. Secretary: C. E. S. Dennis. Registered office: 98, George Lane, South Woodford, Essex.

Eastern Counties Electric Equipment, Ltd.—Private company. Registered October 3rd. Capital, £100 in £1 shares. Objects: To carry on the business of electrical, wireless, mechanical and general engineers, &c. The directors are: G. N. Ogilvie, Brierley Place, Chelmsford, and J. E. D. Thurlow, "Streatham," Lower Anchor Street, Chelmsford. Solicitors: Copland & Sons, Chelmsford.

Blood's Relay Services, Ltd.—Private company. Registered October 3rd. Capital, £3,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in wireless, electrical and mechanical goods, &c. The directors are: R. Blood and Mrs. I. Blood, both of 44, Bond Street, Leigh, Lancs, J. Prescott and Mrs. M. A. Prescott, both of "Mar Nel," St. Helen's Road, Leigh. Registered office: 150, Twist Lane, Leigh, Lancs.

A. S. Plater & Co., Ltd.—Private company. Registered October 1st. Capital, £1,500 in £1 shares. Objects: To carry on business as electrical engineers and general electrical installation contractors, manufacturers of and dealers in dynamos, motors, &c. The directors are: A. S. Plater, 92, Umfreville Road, Harringay, N.4, and Mrs. Violet A. Plater, 92, Umfreville Road, Harringay, N.4.

Wm. G. Walter (Bath), Ltd.—Private company. Registered September 28th. Capital, £3,000 in £1 shares. Objects: To acquire the business of an electrical, general and mechanical engineer and wireless dealer carried on by W. G. Walter at 39-40, James Street West, Bath. The permanent directors are: W. G. Walter, Walmar, Bloomfield Grove, Bath, F. G. Barnard, Barry Road, Oldland, Bristol, and C. F. Blake, Quarry Cliffe, Ashley, Box, Wilts. Secretary: F. G. Barnard. Registered office: 39-40, James Street West, Bath.

Warner's Electrical Trust, Ltd.—Private company. Registered October 3rd. Capital, £20,000 in £1 shares. Objects: To acquire any British, Colonial and foreign patents or inventions which can be utilised or in any way adapted for use in connection with electric cables and wiring and electrical apparatus and goods of all kinds, and also in connection with wireless telephony and radio, &c. The subscribers are: N. Shine, 44, Spital Street, E.1, and B. Gevaerts, 6, Addington Mansions, Highbury, N.5. Secretary: M. Marks. Registered office: 20-21, Broad Street Avenue, E.C.

Returns of Electrical Companies

Capels Wholesale Wireless Co., Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st, 1931 (filed April 21st, 1932). All shares taken up, £1,000 paid. Mortgages and charges: £2,000.

Keswick Electric Light Co., Ltd.—Capital, £20,000 in 5,000 preference and 15,000 ordinary shares of £1. Return dated April 7th, 1932. 4,000 preference and 15,000 ordinary shares taken up. £13,000 paid on 13,000 ordinary shares, £6,000 considered as paid on 4,000 preference and 2,000 ordinary shares. Mortgages and charges, nil.

Ericsson Telephones, Ltd.—Capital, £500,000 in 199,970 preference and 300,030 ordinary shares of £1 each. Return dated April 20th, 1932. All shares taken up. £269,980 paid (being £1 per share on 199,970 preference and 50,010 ordinary, and 8s. per share on 50,000 ordinary shares). £230,020 considered as paid (being £1 per share on 200,020 ordinary and 12s. per share on 50,000 ordinary shares). Mortgages and charges: £50,000.

Paignton Electric Light & Power Co., Ltd.—Capital, £70,000 in £1 shares. Return dated April 7th, 1932. 60,000 shares taken up. £60,000 paid. Mortgages and charges, nil.

Waste Heat & Gas Electrical Generating Stations, Ltd.—Capital, £350,000 in £1 shares. Return dated April 1st, 1932. 320,000 shares taken up. £320,000 paid. Mortgages and charges, nil.

Rose & Partridge, Ltd.—Particulars filed of £250 debentures authorised September 22nd, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £100.

P.R. Products, Ltd.—R. W. Potter, Merrow, Hilltop Road, Whyteleafe, ceased to act as receiver and manager on September 27th.

Mutter, Sanders & Co., Ltd.—G. T. Needham, 4, Dock Chambers, Bute Street, Cardiff, ceased to act as receiver on September 23rd.

Eltax (British), Ltd.—C. Waller, 27, Fitzroy Square, W.1, ceased to act as receiver and manager on June 25th, 1932.

S. Evans & Sons, Ltd.—Capital £1,200 in £1 shares. Return dated May 27th, 1932. 1,200 shares taken up. £1,200 paid. Mortgages and charges, nil.

Electrical Contracts & Maintenance Co. (1925), Ltd.—Capital £3,000 in £1 shares. Return dated April 6th, 1932. 2,405 shares taken up. £2,405 paid. Mortgages and charges, nil.

Pullars Electric Co. (Brighton), Ltd.—Capital £5,000 in £1 shares. Return dated June 28th, 1932. 2,800 shares taken up. £2,100 paid. £700 considered as paid. Mortgages and charges at date of returns: £2,600 (paid off July 28th, 1932), since registered £3,600 debentures issued July 28th, 1932.

Electric and Ordnance Accessories Co., Ltd.—Capital £50,000 in £1 shares. Return dated April 4th, 1932. 45,002 shares taken up. £2 paid. £45,000 considered as paid. Mortgages and charges, £12,000.

Neon Ads. Products, Ltd.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £1,000.

Viking Sales, Ltd.—Issue on September 7th, 1932, of £1,600 debentures, part of a series already registered.

Essex Magneto Co., Ltd.—Capital £2,000 in £1 shares. Return dated June 21st, 1932. 1,524 shares taken up. £1,524 paid. Mortgages and charges, nil.

Krasa & Co., Ltd.—Satisfaction in full on August 4th, 1932, of debenture dated May 7th, 1924, and registered May 28th, 1924. (According to the register of mortgages, the debenture registered May 28th, 1924, originally secured £175 13s. 7d., and further advances, if any).

Welsh Radio & Electrical Supplies, Ltd.—B. Baddiel, Park Buildings, Portland Street, Swansea, was appointed receiver and manager on September 17th, under powers contained in debentures dated April 14th, 1932, and June 17th, 1932.

Southern Counties Radio, Ltd.—Particulars filed of debentures for not more than £5,000 authorised by resolutions of September 9th and 16th, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £1,050.

A. Franks (Wholesale), Ltd.—Capital, £10,000 in £1 shares. Return dated December 31st, 1931 (filed May 6th, 1932). 4,000 shares issued and fully paid up in cash. Mortgages and charges, nil.

Radiocraft Supplies, Ltd.—Capital, £3,500 in £1 shares. Return dated May 8th, 1931 (filed April 23rd, 1932). 2,502 shares taken up. £752 paid, £1,750 considered as paid. Mortgages and charges: £500.

Whitecroft Instrument Co., Ltd.—Capital, £1,000 in £1 shares. Return dated April 19th, 1932. 150 shares taken up. £100 paid, £50 considered as paid. Mortgages and charges, nil.

Wireless Services, Ltd.—Issue on August 4th, of £200 and on September 2nd, 1932, of £600 debentures, parts of a series already registered.

Wilfrid Francis & Co., Ltd.—Capital, £1,000 in £1 shares. Return dated April 27th, 1932. 490 shares taken up. £490 paid. Mortgages and charges, nil.

J. Tee & Co., Ltd.—Capital, £500 in 10s. shares. Return dated March 5th, 1932. 608 shares taken up. £1 10s. paid, £300 considered as paid. Mortgages and charges: £1,000.

Independent Battery Co., Ltd.—I. Levy, 27, Chancery Lane, W.C.2, ceased to act as receiver and manager on September 2nd.

City Notes

Christy Bros. & Co., Ltd., held their annual meeting on September 23rd at Chelmsford. Mr. F. Christy, who presided, in the course of his speech, reviewed the history and progress of the company during the past forty-nine years, and said that as the number of outside shareholders now exceeded 50 per cent. of the total, they were taking the necessary steps to become a public company, and they would in due course apply to the London Stock Exchange for permission to deal in the company's shares and for an official quotation. The accounts for the year ended March 31st last showed a turnover of £239,000, as compared with £196,000 in the preceding year. They proposed to pay a dividend of 10 per cent., less tax, on the ordinary and deferred shares, leaving £16,952 to be carried forward. The dividend for the past twelve years had never been less than 10 per cent. They had prepared a scheme of arrangement whereby the deferred shares would be merged with the ordinary shares and the cumulative preference shares would be changed from 7 per cent. to 6 per cent., but would be made preferential both as regards interest and capital. To compensate for the loss of dividend in changing from 7 per cent. to 6 per cent. bonus shares would be issued to the value of £2,500. They also had a small block of 5 per cent. debentures amounting to £4,600 which they had arranged with the holders to pay off or to issue new preference shares in exchange, and practically all had agreed to take shares. They had also in preparation a new memorandum and articles of association, and when this was done they proposed to issue a prospectus to provide the additional capital necessary to meet the growing needs of the company.

Companies to be Struck off the Register.—The names of the undermentioned companies will be struck off the Register at the expiration of three months unless cause is shown to the contrary:—

Carlton Radio Co., Ltd.
Chorister Radio Co., Ltd.
Electric Spelling Signs, Ltd.
Leysian Electric Lamp Co., Ltd.

Ransomes & Marles Bearing Co., Ltd., report a net profit for the year ended June 30th last of £21,154, to which is added £26,626 brought in, making £47,780. It is proposed to place £5,000 to reserve, and to pay a dividend of 5 per cent., less tax, leaving £24,030 to be carried forward. The report states that the second debenture stock, which originally amounted to £90,000, has now been entirely repaid without impairing the company's strong cash position.

The Marconi International Marine Communication Co., Ltd., announces that in spite of the fact that as a result of the very heavy lay-up of British ships there has been a substantial reduction in the company's revenue from this source, there has been an improvement in the company's profits from other sources and the directors are able to maintain the interim dividend at 5 per cent.

The South London Electric Supply Corporation has decided to capitalise the available reserves, and has allotted to the ordinary shareholders two new ordinary shares for every twenty-five held. The new shares are identical with the old in all respects and participate in the interim dividend of 3 per cent. just paid.

Tube Investments, Ltd., has recommended a dividend on the ordinary shares for the year ending October 31st of 8 per cent., less tax, and at the relative rate on the liaison ordinary shares (same).

Joseph Lucas, Ltd., have recommended a final ordinary dividend of 10 per cent., plus a bonus of 5 per cent., making the total payment for the year 20 per cent. (same).

The Oxford Electric Co., Ltd., has announced that no interim dividend will be paid on the ordinary shares. No interim dividend was paid last year, but 7 per cent. was paid in July last in respect of 1931.

The Midlands Counties Electric Supply Co., Ltd., has declared an interim dividend of 2½ per cent., less tax, on the ordinary shares (same).

The International Automatic Telephone Co., Ltd., has declared an interim dividend of 3¾ per cent. (same).

Stocks and Shares

TUESDAY EVENING.

THE lifting of the prohibition imposed by the Government upon the issue of new capital appeals came as a welcome relief to a good many undertakings which had found themselves hampered by their inability to ask for the fresh money that could be profitably employed in trade and industrial avenues. The ban is not entirely raised, but sufficiently far to enable fresh issues to flow with freedom. The gates are now unlocked which had been closed in order that the Government scheme for the conversion of War Loan Fives should be subject to no outside competition.

The immediate effect was to bring about a weakening of prices in the gilt-edged market, owing to a fleeting impression that the investor will be offered such a wide choice of new stocks as will divert his attention from existing securities, even if it does not lead to a sale of the latter in order to leave the money free for employment in others that offer more attractive terms for his money. It is well known, however, that literally millions of money are awaiting investment. Therefore assumption is probably correct in contending that the absorption power of this capital will prove equal to taking whatever reasonable amount of stock and shares the issuers may provide.

The Gilt-edged Stocks

One of the newcomers is expected to be the Central Electricity Board, in spite of the fact, as already mentioned here, that the last issue of 4½ per cent. stock made by the Authority is not yet fully paid up. The price of this 4½ per cent. debenture, which came out at 96, stands at 103, the same price, that is to say, as the previously issued stock. London and Home Counties 4½ per cent. debenture is quoted at 106½. The prior charge stocks of the Home Railway companies, subject more to money market considerations than to those which govern the ordinary stocks of the railways, have held their prices with noticeable tenacity. Every now and then a block of stock will come in, but so quickly is this taken that it has no effect upon quotations.

Home Railway Stocks

Underground Railway ordinary shares have gone back to 17s. 6d. The successive rises in the price of petrol are considered likely to exercise a decided effect upon outgoings. In addition to this, there is the frank admission of the steam railways that, in spite of all possible economies which the British railway companies have been making, the continued heavy decrease in revenue has outstripped the savings. Railway costs, according to the official statement of the railways, are 117 per cent. higher now than they were in pre-war days. The Railway Companies' Association has framed a proposal for further wage reductions in order to effect substantial relief.

Cables and Wireless

The quietude in the market for Cables & Wireless stocks, to which reference was made here a week ago, has been succeeded by an outbreak of speculative activity that raised the price of the 5½ per cent. preference stock by 5½ points to 75½. The "A" stock advanced 5 to 28, and the "B" ordinary 1½ to 13½. A tip to buy the stocks was very general throughout the Stock Exchange and the City at the end of last week, and, what is more, orders from abroad came in to buy the "A" ordinary. The market in the stocks developed a sudden animation, and the buying was persistent and sustained. The 5½ per cent. preference carries twelve months' arrears of dividend up to the end of last month, and some of the buyers hint at the possibility of these arrears being wiped out within the next six months. The market is at all times a somewhat difficult one in which to operate, and one result of this is that prices are, as a rule, fairly wide in all three classes of stock.

At the International Cable Conference which is now sitting at Madrid, the proposal has been put forward that payment for communications should be adjusted to a gold basis. If this were to materialise, it would make a very material difference to the takings of the Cables & Wireless Company, and the next news is awaited with a lively eagerness.

Globe ordinary are 25s. higher at 9¾ on the advances in the prices of the Cables stocks. American Telephone and Telegraph is a little better at 163½, and Internationals are 18, showing ½ decline on the week. Postal Telegraph & Cable 5 per cent. debenture stock has been down to 40, the 25-year collateral trust gold bonds being officially quoted at 55 middle. The last bargain recorded in them was at 30 on August 10th, less than a month ago.

Dollar Stocks

Prices of American, Canadian and Mexican descriptions show an irregular tendency. Mexican Light & Power preferred shares have risen 5 points to 20. On the other hand, Pachuca fives are similarly lower at 52½. Shawinigan Water at 23 is a point lower. Power Corporation of Canada fell ½ to 17½, Consolidated Gas & Electric of Baltimore keeps steady at 94½ and Pennsylvania Water & Power at 65. Hydro-Electrics dropped about ⅜ to 10⅜. The newspapers state that the revolution in Brazil is practically over, and that the two contending parties have met for serious negotiation. This had a stimulating effect upon most of the Brazilian issues, Government, railway and others, but Brazilian Tractions are unchanged at 14½, nor is any change to be noted in the prices of Rio Tramway bonds.

Manufacturing and Equipment

Rumour is still allowed to have free play in the market for electrical manufacturing and equipment companies. Nothing official has transpired to account for the abrupt movements in Johnson & Phillips. The price holds its improvement at 23s. 9d. Enfield Cables have been the subject of favourable report, and the price put on ⅛ to 4 7/16. Gossip is busy linking one company with another, and, in view of the progress which the industry is bound to make as soon as industrial conditions become more settled, the speculators for the rise argue that they cannot come to any particular harm through the purchase of such shares. Henleys hold their rise at 6, Callenders at 3. Crompton Parkinson ordinary advanced to 22s. 6d. British Aluminium ordinary at 27s. have more than recovered the fall they sustained last week upon the decision of the directors to postpone consideration of a dividend until the books had been made up for the full year.

Home Electricity Supply

South London Electric Supply Corporation has declared a bonus of two new ordinary shares for every 25 old shares held, and has allotted these to the shareholders. The bonus becomes available from the capitalisation of the company's reserves, and carries into effect the resolution passed at a meeting of the company at the end of May last. The new shares participate in the interim dividend of 3 per cent. just paid on the old, with which they are identical in all respects. The price of the shares is a little easier at 32s. Metropolitans have strengthened to 47s., City Lights to 42s., and Charing Cross ordinary to 32s. The provincial group is quiet. A rise of 1s. in the Electrical Distribution of Yorkshire shares has brought the price to 40s. 6d. Northamptons hardened to 46s. 3d., Midland Electric Power to 34s. 6d. Newcastle-on-Tyne preference are a little lower at 30s. 6d.

Miscellaneous Matters

Babcock & Wilcox receded 1s. 9d. to 44s. 6d. Vickers came on offer at 7s., and the iron and steel group as a whole leaned to the lower side. The rubber market is noticeable only for its extreme stagnation. Atlas ordinary drooped to 10s. 9d. Amongst foreign stocks and shares, Lisbon Tramways preference advanced to 14s. 6d., at which price business was lately recorded. The ordinary shares are changing hands on the basis of 18s. Perak Electric ordinary are quoted at 1s. 9d. middle, the 7 per cent. participating debenture stock at 32½. Telephone Properties are a better market at 16s. 3d. for the ordinary, and 22s. 6d. for the 8 per cent. preference. Anticipation looks for an early announcement of 8 per cent. dividend on the ordinary. International Automatic Telephones strengthened to 36s. 3d. New York Telephone 4½ per cent. preference first mortgage bonds have risen to 145. Whitehall Electric preference at 17s. 6d. are 1/16 down. Tokyo Electric sixes have eased off to 70½.

Share List of Electrical Companies

	Nom.	Approx. Dividend. 1930.	1931.	Price, Oct. 4	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	70/-	—	4 5 9
Brompton Ordinary	1	8½	8½	31/-	—	4 10 4
Central Electricity 4½% Deb.	Stock	4½	4½	103	—	4 7 4
Charing Cross Ordinary	1	8½	8½	32/-	+6d.	4 7 6
Chelsea	1	8½	8½	31/6	—	4 9 0
City of London	1	10	10	42/-	+9d.	4 15 3
Clyde Valley	1	8	7	31/3	—	4 9 7
County of London	1	11	10½	48/3	—	4 7 5
Edmundsons' 7% Pref.	1	7	7	29/-	—	4 16 7
Elec. Dis. Yorkshire	1	9	9	40/9	+1/8	4 8 4
Elec. Supply Corporation	1	11	11	52/6	—	4 3 10
Kensington Ordinary	1	8	8	32/6	—	4 6 2
Lancs. Light and Power	1	6½	7	28/9	—	4 17 5
London & Home Counties 4½% Deb.	Stock	4½	4½	106	-½	4 4 6
London Electric	1	9	9	32/-	—	4 7 6
Metropolitan	1	10	10	47/-	+9d.	4 5 1
Midland Counties	1	7	7	32/6	—	4 6 2
Mid. Elec. Power	1	8	8	34/6	+9d.	4 12 9
Newcastle-on-Tyne Ordinary	1	6	6	26/3	—	4 11 5
Do. 7% Pref.	1	7	7	30/6	-6d.	4 11 10
Northampton	1	10	10	46/3	+6d.	4 6 7
Notting Hill 6% Pref.	10	6	6	12½	—	4 16 0
North Met. Elec. 6% Pref.	1	6	6	28/-	—	4 5 9
St. James' and Pall Mall	1	8	8	31/-	—	4 10 4
Scottish Power	1	8	—	33/3	+9d.	4 16 3
South London	1	8½	8½	32/-	-6d.	4 7 6
Urban Ordinary	1	7	—	29/6	—	4 15 0
Westminster Ordinary	1	8½	8½	31/6	—	4 9 0
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	17/6	-1/8	8 11 6
Yorkshire Elec.	1	8	8	38/9	—	4 2 6
HOME RAILS.						
Central London Ord. Assented	Stock	4	4	81½	—	4 18 2
Metropolitan	,,	3½	2½	61	-1	4 2 0
Do. District	,,	5	4½	60½	-1	7 8 9
Underground Electric	1	8	7	17/6	-6d.	8 0 0
TELEGRAPH AND TELEPHONES.						
American Tel. & Tel.	$100	9	9	163½	+1	5 10 1
Anglo-Am. Tel. Pref.	Stock	6	6	103½	—	5 16 0
Do. Def.	,,	1½	1½	26	+½	5 15 5
Cables & Wireless 5½% Pref.	,,	5½	2½	75½	+5½	3 12 10
Do. A 7½% Ord.	,,	—	Nil	28	+5	—
Do. B ord.	,,	—	Nil	13½	+1½	—
Globe Tel. and T. Ord.	10	8½	Nil	9¾	+1½	—
Do. do. Pref.	10	6	6	10¾	—	5 11 7
Great Northern Tel.	10	20	20	26	—	7 13 10
Marconi-Marine	1	15	10	30/9	—	6 10 1
Oriental Telephone Ord.	1	12	12	2½	—	*4 7 5
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	—	—	5/-	—	—
Do. do. 2nd Pref.	5	—	—	3/9	—	—
Do. do. 5% Deb.	Stock	—	—	7	—	—
British Electric Traction Def. Ord.	,,	5	5	300	—	—
Do. do. Pref. Ord.	,,	8	8	133½	—	5 19 10
Brazil Traction	100	—	—	14½	—	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	100½	+1	4 19 6
London & Sub. Trac. 5% Pref.	1	Nil	Nil	10/-	—	—
London United Tram Deb.	Stock	4	4	62½	—	6 8 0
Mexico Trams, 5% Bonds	—	5	5	40	—	12 10 0
Mexican Light Common	100	Nil	Nil	12½	—	—
Do. 7% Pref.	100	7	7	20	+5	—
Do. 1st Bonds	—	5	5	65½	—	7 12 8
Victoria Falls Ord.	1	15	15	75/-	—	4 0 0
Yorkshire (West Riding)	1	Nil	Nil	5/-	—	—
MANUFACTURING COMPANIES.						
Assoc. Elec. Ord.	1	6	4	19/6	—	4 2 1
Do. Pref.	1	8	8	30/-	—	5 6 8
Babcock & Wilcox	1	15	14	44/6	-1/9	6 5 10
British Aluminium Ord.	1	10	5	27/-	+½	3 14 1
British Insulated Ord.	1	15	15	65/-	—	4 12 4
Brush Ord.	Stock	5	Nil	32	—	—
Callender's	1	15	15	3	—	5 0 0
Do. 6½% Pref.	1	6½	6½	27/6	—	4 14 6
Crompton Parkinson Ord.	5/-	30	24	22/6	+1/16	5 6 8
Do. 8% Pref.	1	8	8	30/-	—	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	23/3	—	6 9 0
Do. 5% Deb.	Stock	5	5	100	—	5 0 0
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	4 7/16	+⅛	5 12 8
English Electric	1	Nil	Nil	10/9	—	—
Do. do. Pref.	1	Nil	Nil	12/6	—	—
Ever Ready	5/-	35	35	27/6	—	6 7 0
Ferranti Pref.	1	7	7	24/-	—	5 16 8
G.E.C. Pref.	1	6½	6½	27/6	-6d.	4 14 6
Do. ord.	1	10	8	41/3	-9d.	3 17 6
Henley's	1	30	30	6	—	5 0 0
Do. 4½ Pref.	5	4½	4½	5	—	4 10 0
India-Rubber	1	Nil	Nil	3/9	—	—
Johnson & Phillips	1	10	5	1½	-1/16	4 13 0
Siemens Ord.	1	7½	7½	24/6	+1/16	6 2 5
Telegraph Construction	12	Nil	Nil	11	+½	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged, and all subsequent proceedings will be taken.

1930

31372. "Thermionic valves and circuits for the generation, modulation and controlling of electric oscillations." A. D. Hodgson. June 30th, 1931. (380144.)

1931

4473. "Electrical discharge tubes." J. Brettmon. March 12th, 1931. (380094.)

6855. "Electric ignition interrupters for internal-combustion engines." Electric Auto-Lite Co. March 20th, 1930. (380040.)

7516. "Mercury-vapour rectifiers." British Thomson-Houston Co., Ltd., and F. B. Whitaker. March 11th, 1931. (380097.)

9864. "Method of disturbance prevention in high-frequency electrical transmission systems, and means therefor." Standard Telephones & Cables, Ltd. (J. J. B. Lair and G. E. M. Perroux). April 1st, 1931. (380101.)

10064. "Arrangement of rectifiers suitable for alternating-current measurements and other purposes." Siemens & Halske Akt.-Ges. April 3rd, 1930. (380081.)

10196. "Cooling of electrical machines." M. Adamsikas and G. Massera. April 7th, 1931. (380067.)

13953. "Beacon lights." W. Weule. May 15th, 1930. (380104.)

15613. "Automatic or semi-automatic telephone systems." Standard Telephones & Cables, Ltd. (G. Deakin and W. Hatton). May 28th, 1931. (380046.)

15874. "Electric motor control systems." International General Electric Co., Inc. May 31st, 1930. (380085.)

15941. "Electric heating and cooking stoves." W. H. Myers. December 23rd, 1930. (380049.)

16094. "Controlled light sources for use in electro-optical transmission systems." G. B. Banks and Baird Television, Ltd. June 2nd, 1931. (380109.)

16323. "Electric switches." British Thomson-Houston Co., Ltd. June 6th, 1930. (380057.)

16506. "Electric cables." General Cable Corporation. June 20th, 1930. (380113.)

16558. "Dynamometers for automobile brake-testing machines." A. D. Powell and J. Bradbury & Sons, Ltd. June 6th, 1931. (380060.)

16644. "Driving arrangement for the scanning of pictures for television receivers." Telehor Akt.-Ges. June 7th, 1930. (380115.)

16925. "Automatic electric circuit-breakers." C. W. Kuhn and W. C. Stevens. June 11th, 1930. (380123.)

16982. "Telegraph receiving apparatus." Creed & Co., Ltd. (Teletype Corporation). June 11th, 1931. (380125.)

16983. "Motor control devices for telegraphic apparatus." Creed & Co., Ltd., R. D. Salmon and S. E. Kirk. June 11th, 1931. (380126.)

16984. "Telegraph systems." Creed & Co., Ltd., and A. E. Thompson. June 11th, 1931. (380127.)

16990. "Electric plugs." J. A. Bond and Imperial Chemical Industries, Ltd. June 11th, 1931. (380128.)

17143. "Electric transformers and other electrical apparatus." British Thomson-Houston Co., Ltd. (General Electric Co.). June 12th, 1931. (380136.)

17167. "Electrical oscillation generators." Marconi's Wireless Telegraph Co., Ltd., and W. A. Appleton. June 12th, 1931. (380138.)

17168. "Electrical oscillation generators." Marconi's Wireless Telegraph Co., Ltd., and E. W. B. Gill. June 12th, 1931. (380139.)

17945. "Directional wireless signalling systems." C. Lorenz Akt.-Ges. June 23rd, 1930. (380166.)

18029. "Light-sensitive cells and the like." Arcturus Radio Tube Co. June 30th, 1930. (380168.)

18144. "Electrical heating of buildings and the like." L. J. Fowler, C. C. M. Bell and Crittall & Co., Ltd. June 23rd, 1931. (380169.)

18367. "Automatic mechanism for operating gas valves or electric switches." Chance Bros. & Co., Ltd., and J. H. Abbink-Spaink. June 25th, 1931. (380171.)

18609. "Trolley wheels and heads as used in tramcar and trolley-bus service." Brush Electrical Engineering Co., Ltd., and B. A. M. Boyce. June 27th, 1931. (380175.)

19465. "Electrical apparatus for automatically controlling an internal-combustion engine." C. G. Thorne and Dangar, Gedye & Co., Ltd. July 6th, 1931. (380190.)

19783. "Radio-telegraphy." Siemens & Halske Akt.-Ges. October 29th, 1930. (380194.)

19993. "Intercommunicating wired high-frequency telephone system." International Radiophone Corporation. July 19th, 1930. (380199.)

20120. "High-frequency oscillation generators." Marconi's Wireless Telegraph Co., Ltd. July 28th, 1930. (380201.)

20876. "Direction-finding by wireless." G. Matheson. May 20th, 1932. (380209.)

21254. "Electric accumulators or storage batteries." Britannia Batteries, Ltd. (Accumulatoren-Fabrik Akt.-Ges.). July 24th, 1931. (380211.)

22107. "Telegraphic systems and apparatus therefor." W. W. Triggs (International Inventions Corporation). August 4th, 1931. (380217.)

22307. "Moving-coil galvanometers and like measuring instruments." A. H. F. T. Valdez. August 6th, 1931. (380219.)

22761. "Electrical plug terminals." F. C. Pollok and D. A. McErlane. May 11th, 1932. (380226.)

23896. "Optical systems for use in electro-optical transmission systems." G. B. Banks and Baird Television, Ltd. August 25th, 1931. (380234.)

24354. "Manufacture and production of electrodes for electric storage batteries." J. Y. Johnson (I.G. Farbenindustrie Akt.-Ges.). August 29th, 1931. (Addition to 331540.) (380242.)

25195. "Mounting of electrical apparatus." Siemens Bros. and Co., Ltd., and A. F. Thorne. September 8th, 1931. (380246.)

25211. "Apparatus for the treatment of organisms with electric current." E. W. Waldemar and R. B. L. Nobel. September 10th, 1930. (380247.)

26644. "Mercury-vapour rectifiers." Akt.-Ges. Brown, Boveri et Cie. September 30th, 1930. (380261.)

32030. "Metal-vapour rectifiers." Siemens-Schuckertwerke Akt.-Ges. December 22nd, 1930. (380296.)

34384. "Thermostatic electric switches." General Electric Co., Ltd., C. W. Stopford, and M. S. H. Hunt. December 11th, 1931. (Addition to 324832.) (380312.)

34569. "Recessed type quick make-and-break electric switches." W. J. Allum. December 14th, 1931. (380314.)

34741. "Keying arrangements for wireless telegraphic transmitting apparatus." C. Lorenz Akt.-Ges. March 31st, 1931. (380316.)

35046. "Directional refractors for street lamps." Revo Electric Co., Ltd., F. H. Reeves, Holophane, Ltd., and S. English. December 18th, 1931. (380318.)

35452. "Production of high-frequency oscillations." British Thomson-Houston Co., Ltd. December 22nd, 1930. (380321.)

35098. "Control of high-frequency tuning apparatus." British Thomson-Houston Co., Ltd. December 31st, 1930. (380325.)

1932

457. "Covers for underground electric cables." C. E. Morris. January 7th, 1932. (380327.)

2474. "Receivers and thermionic amplifiers, more particularly for wireless telephony." Ideal Werke Akt.-Ges. für Drahtlose Telephonie. February 24th, 1931. (380341.)

5047. "Electrical junction boxes." O. Woertz. February 19th, 1932. (380355.)

6071. "Manufacture of electric incandescent lamps and the like." General Electric Co., Ltd. March 3rd, 1931. (Addition to 283890.) (380364.)

8401. "Amplifier circuit arrangements." Marconi's Wireless Telegraph Co., Ltd. March 19th, 1931. (380377.)

9075. "Cathode-ray tubes with two or more pencils of rays." M. Knoll and Cambridge Instrument Co., Ltd. March 27th, 1931. (380381.)

9441. "Moisture-sensitive indicating or protecting devices for electrical apparatus." International General Electric Co., Inc. April 1st, 1931. (380383.)

9514. "Direct-reading radio compasses." R. Braillard, J. Marique, and Soc. Anon. Internationale de Télégraphie sans Fil. April 3rd, 1931. (380385.)

10705. "D.c. dynamoelectric machines with interpoles." English Electric Co., Ltd., and J. W. Voelcker. April 14th, 1932. (380389.)

11242. "Electric insulating cap." Naamlooze Vennootschap Electriciteits Maatschappij Electrostoom. April 27th, 1931. (380393.)

11893. "Electrical resistance welding machines for seam welding." W. Fahrenbach. April 24th, 1932. (380397.)

12621. "Electric cables." Soc. Italiana Pirelli. May 2nd, 1931. (380401.)

17086. "Apparatus for indicating the direction of travel by means of electromagnetically actuated direction-indicators, in particular for motor vehicles." M. Ruhl and E. Neumann. June 16th, 1932. (380416.)

17590. "Picture-assembling apparatus for television receivers." Suddeutsche Telefon-Apparate-Kabel-und Drahtwerke Akt.-Ges. Tekade. June 27th, 1931. (380419.)

18024. "Installation for the electric killing of whales." Aktieselskapet Elektrisk Avlivning Av Hval. July 8th, 1931. (380422.)

18564. "Electric ignition interrupters for internal-combustion engines." Electric Auto-Lite Co. March 20th, 1930. (Divided application on 380040.) (380072.)

19257. "Mercury-vapour rectifiers." British Thomson-Houston Co., Ltd., and F. P. Whitaker. March 11th, 1931. (Divided application on 380097.) (380142.)

20964. "Method of insulating electric apparatus." British Thomson-Houston Co., Ltd. July 25th, 1931. (380426.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from September 28th :—

Dudlo (lettering and design). No. 531716. Class 5. Enamelled wire. Dudlo (lettering only). No. 531719. Class 5. Enamelled wire. No. 531720. Class 8. H.t. coils, motor coils and windings, and ignition coils.—British Insulated Cables, Ltd.

William Whiteley, Ltd., London, W.2. Universal Providers (lettering and design). No. 532291. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—William Whiteley, Ltd., London, W.2.

Mac-O-Line. No. 533629. Class 8. Electric cables.—Macintosh Cable Co., Ltd., Sinfin Lane, Normanton, Derby.

Rejectostat. No. 534340. Class 8. Instruments and apparatus and parts thereof for radio-telegraphy, telephony and television.—Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent.

Regina. No. 534346. Class 8. Radio-telegraphic and telephonic instruments and apparatus and parts thereof.—Wallburn (London), Ltd., 186, Temple Chambers, Temple Avenue, E.C.4.

Coolicon. No. 534403. All goods in Class 13.—Benjamin Electric, Ltd., Tariff Road, Tottenham, N.17.

The Institution of Engineering Inspection

This Institution opens its 1932-33 session on November 9th when Mr. C. H. Davy will read a paper on "The Development of Water Tube Boilers." All meetings will be held at the Royal Society of Arts, John Street, Adelphi, W.C. On November 22nd-25th evening visits have been arranged to Broadcasting House, Langham Place, London, W.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdare.—Garage for 100 buses for the Red & White Motor Bus Co.; G. Davies, builder, Elm Grove.

Alton (HANTS).—Houses (50); G. H. Webb, U.D.C. surveyor.

Arbroath.—Stores for F. W. Woolworth & Co., Ltd., London; the manager.

Aylesbury (BUCKS).—Houses (100); R.D.C. surveyor.

Ayrshire.—Houses (40), Kilmaurs (electrical work), for the C.C.; W. Reid, architect, 14, Wellington Square, Ayr.

Barking.—Factory extension, River Road; De Pass Fertilisers, Ltd. Factory, Tanner Street; G. Griffiths. Joinery works, Alfred's Way; A. W. Jaggers. Four shops, Ripple Road; Lord & Mellowdew, Ltd. Six shops and flats, East Street; Luck, Bennett & Luck.

Bexley.—Houses (22), Pickford Lane; U.D.C. surveyor.

Birkenhead.—Central school, Alpha Drive, for the E.C.

Birmingham.—Branch premises for the Municipal Bank, Ltd., South Yardley; A. Pearce, builders, Bordesley Green.

Bishop's Stortford.—Extensions, Haymeads Institution (£31,796); J. E. McKenzie, Watford Way, Hendon.

Bo'ness.—Houses (40); burgh surveyor.

Brighton.—Houses, Reading Road (40) and Peel Road (28); T. J. Braybon & Son. Clinic and baths, West Street and North Road; Special Corporation Committee. Development of Carden Avenue for Braybons, Ltd.; Thompson & Walker. Alterations, Grand Hotel, King's Road; Grand Hotel Co., Ltd. Reconstruction of Post Office, Ship Street; Postmaster-General.

Bridlington.—Waterworks engine house for the T.C.; C. B. Newton, Burnett Avenue, Hull.

Bury (LANCS).—School, Fell Street; J. Chadwick, borough engineer.

Chelmsford.—Houses (20), Woodhouse Street; S. W. Stedman. County Hall extensions (£21,745); T. J. Bailey, contractor.

Chester.—Greyhound track, Sealand Road, for Provincial Greyhound Syndicate, Ltd.; K. Kenna, architect.

Chislehurst.—Houses (119) for Chislehurst Estates, Ltd.

Colwyn Bay.—Shop premises, Conway Road; F. J. Tucker, builders, Lannerch Road Yard.

Consett (DURHAM).—Houses (200); J. Eltringham, U.D.C. surveyor, Council Offices.

Dewsbury.—Senior school, Bank Top, Earlsheaton; director of education.

Durham.—Extensions, Poor Law Institutions, Easington, Bishop Auckland and Barnard Castle; W. J. Merrett, county surveyor, 43, Old Elvet. Additions to Seaham Harbour, Camden Square, Intermediate School and Seaham Intermediate Council School; F. Willey, architect, 34, Old Elvet.

East Riding.—Public library, Filey; county architect, Beverley.

Edinburgh.—Golf pavilion, &c., Braid Hills (£5,000); city architect. Six shops and houses, Corstorphine Road; Bangholm Building Co., Trinity.

Essex.—School for defective children, Heathway, Dagenham (£7,980), for the County E.C.; J. Stuart, county architect, Chelmsford. Schools, Ardleigh Green (£5,449), and Dagenham (£5,838); W. J. Wade, builder. School, Hornchurch (£5,680); Hosking & Son, builders

Exeter.—Houses (300), Wonford; city architect.

Frome (SOMERSET).—Creamery extensions, West Park Dairy Co., Ltd.; J. A. Beynon, architect, Nunney Road.

Gateshead-on-Tyne.—Garage, Enfield Road; L. Ather, builder, Windy Nook Road, Felling.

Glasgow.—Premises for the Royal Humane Society (£1,400); secretary.

Hanley.—Conversion of Palais de Danse to cinema for Waverley Hotel (Hanley), Ltd.; Birkett & Grant.

Harrogate.—Body-building works for the West Yorkshire Road Car Co.; Kershaw & Hill, builders.

Hemel Hempstead (HERTS).—Extensions of Poor Law Institution (£23,800); W. H. Hobday, county architect.

Herne Bay.—Shops, Broadway and Sea Street; J. Wilson.

High Wycombe.—Furniture factory, Gordon Road, for J. Gomm, Ltd. Waterworks pumping house (£5,054) for the T.C.; A. C. Dean, builder. Factory extensions, Sands, for W. V. Hearn.

Huddersfield.—Houses (28), Wormald Street, Almondbury; Lockwood Scar; and South Cross Road, Cowcliffe; borough engineer, 1, Peel Street. Alterations, 112, Lockwood Road (electrical work); Stocks, Sykes & Hickson, architects.

Ipswich.—Houses (50), Gainsborough Estate, and clearance of Gipping Street area; city engineer. Vicarage, St. Mary Elms (£2,675); vicar. Alterations to Eastern Union Mills (£2,000); Van Perstein & Munro.

Irish Free State.—(DUBLIN).—Flats (32), Crabbe Lane, for the Corporation; housing architect, Lord Edward Street. (Co. LEITRIM).—Schools, Manorhamilton, Drumkeerin, Keshcarrigan and Carrick-on-Shannon, for the Vocational E.C.; P. J. Brady, architect, Ballyhase, Co. Cavan. (Co. WEXFORD).—Technical school for the County Vocational E.C.; Robinson & O'Keeffe, architects, 8, Merrion Square, Dublin.

Leicester.—Rehousing (16 acres), Freakes Ground; city engineer. School, Imperial Avenue (£12,287); G. Gurney & Son, builders. Bus garage extension (£18,529); W. M. Shary & Sons, Ltd., builders. Extensions to City Hospital (£6,250); Chitham and Co., Ltd.

London.—(EAST HAM).—Flats and houses, various sites (£41,000); pavilion for Harts Sanatorium (£11,000); borough engineer. Factory extension, Greenhill Grove; Leslie Bros. Shop and hall, High Street North; C. W. Hodgson. (EDMONTON).—Elementary school, Weir Hall, for the E.C. (FINCHLEY).—Shops and flats, Ballards Lane; D. Morris & Sons, Ltd. (FOREST HILL).—Houses, Canonbie Road; W. R. Hindmarsh and Co. Houses, Dunoon Road and Honor Oak Road; Messrs. Pearsons. (HAMMERSMITH).—Tenements (32), King Street; borough engineer. (HIGHGATE).—Flats, North Hill (£7,000); Turner & Payne, builders, North Finchley. (LEWISHAM).—Houses (25), Brockley Grove; H. Macintosh, East Croydon. Extensions, Aerial Works, Grotes Place; McCollock & Kingslake. (POPLAR).—Additions to Langbourne Wharf, West Ferry Road; Hooper, Cushen & Co., Millwall, S.E.

Malton (YORKS).—Houses; G. D. Channon, architect, 4, Market Street.

Meir (STAFFS).—Houses (46), Stoke-on-Trent Corporation Estate; Finney & Broadhurst, Burslem.

Newburn-on-Tyne.—Houses (300); J. A. Weatherley, U.D.C. surveyor, Council Offices.

Newcastle-on-Tyne.—Houses (20), Elswick Road; J. McEwan, builder, Lynwood Terrace. Houses, Forest Hall, for Mather & Thompson; J. N. Fatkin, architect, 77, Westgate Road. Conversion of Beechgrove Church into cinema; H. T. Smelt, builder.

North Kesteven (LINCS).—Houses (26); J. Chadwick, R.D.C. surveyor, 25, Clasketgate, Lincoln.

North Shields.—Houses and shops, Verne Road; Woodall and Shepherd, builders.

Padiham.—Houses (64), Abingdon Street; borough surveyor.

Pontefract.—Pumping station, Eggborough, for the T.C.; F. W. Hodson, consulting engineer, Bank Chambers, Loughborough.

Renfrew.—Electrical installation at Peat Road R.C. School; J. C. Fraser, county clerk, Paisley.

Rutherglen.—Houses (138), (electrical work); H. Inglis, burgh surveyor.

Ryton-on-Tyne.—Houses; J. P. Dalton, surveyor, Council Offices.

Scarborough.—Hotel, Wheatcroft Cliff, for Messrs. Laughton (Pavilion Hotel); F. H. Jones, architect, 102, Westborough. Alterations to premises, Marlborough; E. C. Tasker, architect, 1, Harcourt Place.

Shenley (HERTS).—Buildings, mental colony, for the Middlesex C.C. (£53,751); J. Laing & Son, Ltd., Mill Hill.

Shipley.—Branch stores, Wrose Road; Windhill Co-op. Society, Ltd.

Slough.—Factory, Bestobell Road, for Slough Estates, Ltd.

Southgate.—Houses (52), Farm Road; G. W. Newman. Houses (80), Seafield and other roads; W. S. Read.

South Moor (Co. DURHAM).—United Methodist church; T. Welsh, architect, Louisa Colliery.

Southport.—Houses (104), Guildford Road Estate (£27,820); Baker & Foster, Burnley. Premises, Eastbank Street and King Street; Co-operative Society, Ltd.

South Shields.—Houses, Green Lane, for the T.C. (£13,644); W. D. Allison, builder, Whitburn. Alterations and additions to 172 houses; W. Welsh, R.D.C. Surveyor, Council Offices, East Boldon.

Stoke-on-Trent.—Houses, Carmountside Estate; A. Moss, Milton (74), and C. Cornes & Son, Hanley (90). Social centre, Greasley Estate; Sutton trustees.

Sunderland.—Schools, Ford Estate and Commercial Road, for the E.C. (£56,000); O. T. Mark, architect, Town Hall.

Swansea.—School centre, Oxford Street (£1,200); borough architect.

Thornton Heath (SURREY).—Additions to bakery of F. Broomfield, 322, Whitehorse Road; C. Lewin, architect, 9, Cherry Orchard Road, Croydon.

Tynemouth.—Stores and offices, Union Quay (£2,400); J. L. Beckett, borough engineer, Town Hall.

Wallingford.—Waterworks pumping plant for the T.C.; Fiddian & Deeley, engineers, 13, Church Street, Stourbridge. Houses (50); R.D.C. surveyor.

Warrington.—Houses (98), Princess Avenue (£28,665); Clough and Gaskell, Wigan. Houses (42), Reynolds Street (£12,524); D. Cooper.

Welwyn Garden City.—Houses (57), and flats (9); W. J. Simms, Sons & Cooke, Ltd., builders.

Whickham-on-Tyne.—Four shops, Front Street, for T. Wilkinson; S. J. Stephenson, architect, 2, Saville Place, Newcastle.

Wimbledon.—Development of part of the Drax Estate for Admiral Drax; A. M. L. McKay.

Worcester.—Reconstruction of business premises for Russell and Dorrell, High Street; Pollard & Co., Ltd., builders, Clerkenwell, E.C. Reconstruction of business premises at The Cross; G. Pardoe & Sons, builders, 27, Waterworks Road.

York.—Houses (184), and 24 flats; city engineer.

Special Vehicles for Frequency Standardising

Several interesting motor vehicles have, according to *Motor Transport*, been supplied recently to the Newcastle-upon-Tyne Electric Supply Co., Ltd., by Scammell Lorries, Ltd., for use in connection with the standardisation of frequency which is being carried out in Northumberland, Durham, and the North Riding of Yorkshire. The machines include several mobile workshops, four special machinery transporters, and two cross-country type rigid six-wheel vehicles. The workshops are intended for use on factory sites and collieries where alterations are in progress which in many cases involve modifications in the construction or assembly of heavy electrical apparatus. When travelling the shop is completely enclosed and has more or less the appearance of an ordinary box van. Power for lighting the shop, driving the machines, and such auxiliary equipment as electric hammers, drills, &c., is supplied by a Parsons engine and a 15-kW 220-V generator. The rigid six-wheelers are intended for use where the work necessitates the conveyance of electrical apparatus in rural districts where the roads are very bad.